Corporate Governance and Value Creation: Evidence from Private Equity[1]

by

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First draft: 7 April 2008

This draft: 31 May 2008

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[1] A part of this study was undertaken while Viral Acharya was visiting Stanford-GSB. All errors remain our own. We are especially grateful to the PE firms who assembled and gave us access to sensitive deal data. Viral Acharya was supported during this study by the London Business School Governance Center and Private Equity Institute, the Leverhulme Foundation, INQUIRE Europe, and London Business School's Research and Materials Development (RAMD) grant. McKinsey & Company has also devoted significant human resource to carrying out the fieldwork and analysis, not for any client but on its own account. We are grateful to excellent assistance and management of data collection and interviews by Moritz Hahn, Amith Karan, Ricardo Martinelli, Prashanth Reddy and David Wood of McKinsey & Co. Ramin Baghai-Wadji, Ann Iveson, Chao Wang and Yili Zhang also provided valuable research assistance. The study has benefited from comments of Tim Kelly (discussant) and seminar participants at European Central Bank and Centre for Financial Studies Conference in Frankfurt, University of Chicago and University of Illinois at Chicago joint conference, London Business School, McKinsey & Co. and participating PE firms. All errors remain our own.

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Abstract

We examine deal-level data on private equity transactions in the UK initiated during the period 1996 to 2004 by mature private equity houses. We un-lever the deal-level equity return and adjust for (un-levered) return to quoted peers to extract a measure of "alpha" or out-performance of the deal. The alpha out-performance is significant on average and robust during sector downturns. In the cross-section of deals, alpha is related to enterprise-level operating performance, especially to greater improvement in EBITDA to Sales ratio (margin) during the private phase, relative to that of quoted peers. In particular, out-performing deals either grow their margins substantially, or grow margins somewhat whilst expanding their revenues substantially. A significant portion of the margin improvement is realized in the early phase of out-performing deals. Based on interviews with general partners involved with the deals, we find that out-performing deals are associated with top management turnover during the early phase of the deal, employment of value-creation initiatives for productivity and organic growth, high intensity of engagement of private equity houses, and complementing top management with external support. Overall, our results are consistent with mature private equity houses creating productive growth for portfolio companies through active ownership and governance.

JEL: G31, G32, G34, G23, G24.

Keywords: leveraged buyouts (LBO), management buyouts (MBO), active ownership, activism, management turnover, alpha

1. Introduction

In his seminal piece, "The Eclipse of the Public Corporation", Jensen (1989) argued that leveraged buyouts (LBOs) create value through high leverage and powerful incentives. He proposed that the public form of the corporation is often characterized by entrenched management that is prone to cash-flow diversion and averse to taking on efficient levels of risk. Consistent with Jensen's view, Kaplan (1989), Smith (1990), Lichtenberg and Siegel (1990), and others provide evidence that LBOs do create value by significantly improving the operating performance of acquired companies and disgorging cash in the form of high debt payments.

The recent literature has focused instead on the returns that private equity (PE) funds – which usually initiate the LBO and own (or manage, to be precise) at least a majority of the resulting private entity – generate for their end investors such as pension funds. In particular, Kaplan and Schoar (2005) studied internal rates of return (IRRs) *net* of management fees for 746 funds during 1985-2001 and found that the median fund generated only 80% of S&P500 return and the mean was only slightly higher, at around 90%.[2] The evidence is, however, better for the largest and most mature houses (those that have been around for at least 5 years). Kaplan and Schoar document that, for funds in this sub-set of PE houses, the median performance is 150% of S&P500 return and the mean is even higher at 170%. Furthermore, this performance is persistent, a characteristic that is generally associated with potential existence of "skill" in a fund manager. Notably, such persistence has not been found in mutual funds and when found has generally been in the worst performers (Carhart, 1997).

Our paper is an attempt to bridge these two strands of literature concerning private equity, the first of which analyses the operating performance of acquired companies, and the second of which analyzes fund IRRs. We focus on the following questions: (1) Are the returns to large, mature PE houses simply due to financial gearing over and above gearing in the comparable quoted sector, or do these returns represent the value created in enterprises they engage with, over and above the value created by the quoted sector peers? (2) What is the operating performance of companies owned by these PE houses relative to that of quoted peers, and how does this performance relate to the value created by these houses? (3) What are the distinguishing characteristics of the governance and operational approach of these PE houses relative to those of the PLC boards, and which of these characteristics are associated

[2] This evidence has been confirmed by studies in Europe (see Related Literature) and many believe these numbers are at best rosy given survivorship biases in data employed. This by itself does not necessarily refute Jensen's original claim: It could simply be that PE funds keep through fees the value they create. The puzzle the evidence on median return of PE funds raises is thus more about why their investors (the limited partners) choose to invest in this asset class as a whole, an issue investigated by Lerner and Schoar (2004) and Lerner, Schoar and Wong (2007).

with value creation? In particular, we are most interested in taking a step beyond Jensen's hypothesis by investigating whether there is any evidence that large, mature PE houses create enterprise value by engaging in "active" ownership or governance and operational engineering, in addition to employing leverage and powerful incentives.

INSERT FIGURE 1 HERE.

To answer the first of these three questions, we develop a methodology (see Figure 1) to decompose the deal-level equity return earned by a PE house, measured by the IRR, into two components: the un-levered return and amplification of this un-levered return by deal leverage. Next, we extract from the un-levered return a benchmark (un-levered) return that the quoted peers of the deal generated over the life of the deal. The difference between these two un-levered returns is what we call "alpha", a measure of *enterprise-level* out-performance of the deal relative to its quoted peers; that is, after purging the effects of financial leverage. The leverage amplification can also be further decomposed into amplification due to deal leverage on the quoted peers' return and amplification on alpha. We posit, and later verify, that the alpha out-performance of a deal captures the return associated with operational strategies and governance changes. Since such alpha also contains (idiosyncratic) risk at the deal level, the leverage amplification on alpha can be interpreted as financial leverage amplifying the operating risk of the deal.

We apply this methodology to 66 large deals (greater than €100mln in enterprise value) in the UK from 12 mature PE houses initiated over the period 1996 to 2004.[3] For these deals, the participating PE houses provided sensitive deal-level data on operating and financial performance, ownership and board structures, as well as interview-based data on governance and operating changes implemented at different stages of the deal. We find that, on average, about 20-25% of average deal IRR comes from the alpha out-performance and another 25-30% is due to amplification of alpha by financial leverage, the remaining being due to exposure to the quoted sector (that is, due to sector-picking ability or simply due to luck) and leverage amplification on this. Although alpha has substantial variation across deals, it is statistically significant, consistent with the view that large, mature PE houses generate higher (enterprise-level) returns compared to benchmarks.

In the cross-section and time-series, alpha has several interesting properties. First, while alpha and IRR are positively related (R^2 of 52%), the relationship is far from being perfect. There are several deals with high IRRs that have relatively low alphas. Second,

[3] We believe this time period is particularly suited for studying value creation through operational engineering. Kaplan and Stromberg (2008) note that operational engineering became a key private equity input to portfolio companies only in the last decade.

alpha appears robust to sector downturns. In fact, it is stronger during sector downturns. When we identify deals where the quoted sector delivered negative total return to shareholders over the life of the deal, we find that alpha for this sub-sample of deals is about three times as large as that for the overall sample. Without this alpha, these deals would not have generated positive IRRs. Finally, the relationship between alpha and deal leverage is non-monotone. Deals which have the lowest leverage at time of acquisition have the highest alpha; however, deals with the highest leverage have the second-highest alpha. Since leverage amplifies not just the return due to a deal's sector risk, but also due to its operational risk, this pattern suggests that it may be hard to tease out whether leverage itself contributes to alpha (an endogeneity concern) or whether it magnifies it (a pure financial leverage effect).[4]

Regarding the second question we raised at the outset, about whether alpha is related to value creation in terms of operational improvements, we show that this is indeed the case, and hence that alpha is not merely an artefact of our return attribution methodology. We find that in the cross-section of deals, alpha is correlated with stronger operating performance relative to quoted peers, especially with greater improvement in the EBITDA to Sales ratio (margin). The improvement in margins turns out to be a robust determinant of alpha, in particular, robust to controlling for deal duration, size, whether the deal involved significant merger and acquisition activity, measures of having acquired the deal cheap or having sold it well, and dummies for various sub-periods by acquisition and entry time (that control for trends in cost of debt finance and stock-market valuations).

In contrast to perceived wisdom, especially in the media, we do not find that deals in our sample are subject to asset-stripping: in fact, they grow their revenue beyond that of the quoted peers and grow their earnings even more, suggesting achievement of *productive growth*; they increase employment – though not as much as their peers – and have greater profitability per head (EBITDA per full-time equivalent (FTE) employee count). The highest alpha deals grow assets, employment and profitability per head the most. Other aspects of operating performance suggest that productive growth arises from more efficient use of capital. There is an increase in the absolute level of capital expenditures (CAPEX) and overheads (SG&A) during the private phase, but there is a reduction in CAPEX to Sales and SG&A to Sales ratios.

To investigate further the exact nature of operational strategies associated with successful deals, we first partition deals into "inorganic" deals, which involved at least one significant acquisition or divestment, and "organic" deals where M&A activity was absent. Of the inorganic deals, those including divestments appear the worst in terms of both IRR and

[4] It is possible that alpha, which we later attribute to value creation inputs from PE houses, is managed by the PE houses in order to deliver a hurdle IRR rate expected by their investors. For example, when leverage is low, alpha is high; when sector performance is low, again alpha is high.

alpha standpoint. Interestingly, deals including acquisitions or roll-ups have significant IRR on average but hardly any alpha. In contrast, organic deals have both high IRR and high alpha and contribute most of the average alpha arising in our full sample.

We divide organic deals further into four partitions (all based on *realized* improvements relative to quoted peers or the lack thereof): (1) those that improved their margins but did not grow revenues; (2) those that grew both; (3) those that grew revenues but not margins; and, (4) others that grew neither revenues nor margins. We find that, of these four "strategy" partitions, the first two create significant alpha whereas the last two create virtually none. This is reflected in the operating performance of these deals: the margin-only deals have substantial growth in EBITDA margins, which has a turnaround or "shock therapy" aspect to it in that a substantial portion of the margin growth occurs in the very first year of the deal and is accompanied by substantial reduction in headcount but improvements in profitability (likely through shutting down of inefficient units). In contrast, the margin-and-revenue deals show a relatively smaller improvement in margins, but they capitalize on this with more substantial growth (likely through expansion to new customers and geographies), overall being consistent with a "creative destruction" model of value creation. Finally, the lack of out-performance of growth-only deals illustrates that not all growth creates relative value, especially that which occurs simply due to sector-picking or simply riding on a sector's upturn.

We conducted in-depth interviews with general partners (GPs) involved in our deals, essentially wherever the relevant GPs had not left the PE house in question. Based on these interviews, we identified 21 questions to which the answers implied either relatively active or inactive governance. Each response was awarded a score of either 1 (active) or 0 (inactive), and the 21 questions compiled into seven groups, each containing three related questions. Due to time constraints, not all questions were answered for all interviews. Hence, to correct for this, the subtotals for each of the seven groups were normalised by dividing the total score, ranging from 0 to 3, by the number of questions answered; the grand total, ranging from 0 to 21, was normalised by dividing it by the number of available sub-scores. The seven groups are as follows: (1) Changed top management (CEO, CFO, etc.) within 1st 100 days; (2) Launched multiple initiatives for value creation; (3) Shaped value creation plan; (4) Provided management support, especially in the 1st 100 days; (5) Provided strong incentives (how high-powered in terms of equity ownership, to what level of employees, and how sensitive to threshold performance indicators); (6) Created an efficient board structure (smaller, few non-executive directors or NXDs excluding GPs and separation of CEO and Chairman); and finally (7) Leveraged external support.

In regression analysis that links these governance scores to alpha, we find that alpha is explained best by the replacement of management in the 1st 100 days and leveraging of

external support. While this does not necessarily imply that firing management or getting external advice from experts automatically leads to value creation, it is symptomatic of what critical agency problem is being unlocked by successful PE houses for value creation: turnover of entrenched management in PLCs; taking private the inefficiently run subsidiaries of conglomerates – a process that generally requires change in management of the spun-off units; professionalization of small family-owned businesses by bringing in executives with experience of large firms; and improving process efficiency through productivity initiatives (better supplier contracts, overhead reductions, better working capital and CAPEX management). In non-parametric analysis, margin-only deals (the highest alpha deals) are associated with greater top management replacement and shaping of value-creation plans in the 1st 100 days; greater intensity of engagement by GPs during the 1st 100 days; provision of support to management both by the PE house and external consultants; and, greater employment of organic growth and productivity initiatives, again especially in the 1st 100 days. Given the currently small size of our sample, it is difficult to draw firmer, causal relationships, but overall the evidence is supportive of value creation by top, mature PE houses, at least partly as an outcome of their active ownership and governance.[5]

The rest of the paper is organized as follows. In Section 2, we review the related literature. In Section 3, we provide a description of data we collected and some summary statistics. In Section 4, we describe the methodology for calculating alpha out-performance measure from the levered equity return on a private equity deal. In Section 5, we discuss all our empirical results: characteristics of alpha out-performance; operating out-performance and its relationship to alpha; and, interview-based governance scores and their relationship to alpha. In Section 6, we discuss some robustness checks. Section 7 presents the policy implications of our results. Section 8 concludes with a statement of ongoing work to extend our dataset and directions for future research.

2. Related literature

In a seminal theoretical piece, Jensen (1989) argued that LBOs create value in their portfolio companies through a combination of high financial leverage and powerful incentive schemes: the increased management ownership provides strong incentives for managers to improve operating performance and generate cash flow. The high debt level limits manager's ability to squander free cash on wasteful investments. In addition, PE funds' active participation in the management of the companies improves monitoring.

[5] "Active Ownership" study by Heel and Kehoe of McKinsey & Co. (2004) showed for a smaller sub-set of deals out-performance relative to quoted peers and out-performance correlated with PE firm

Consistent with Jensen's hypothesis, Kaplan (1989) analyzes the post-buyout operating performance of 48 large management buyouts (MBO) of public companies completed between 1980 and 1986. He finds that in the three years after the buyout, these companies experienced increases in operating income, decreases in capital expenditures, and increases in net cash flow. Specifically, operating income, adjusted for industry changes, remained unchanged in the first two post-buyout years but increased 24% in the third year[6]. The median industry-adjusted net cash flow in the first three post-buyout years was 22%, 43%, and 81% larger than in the last pre-buyout year. The increases in net cash flow were driven both by increases in operating incomes and by decreases in capital expenditures. Consistent with the operating changes, Kaplan also finds that the mean (median) increases in market value adjusted for market-wide returns is 96% (77%) from two months before the buyout announcement to the post-buyout sale, suggesting increases in operating performance as an important source of the buyout premium.

In her sample of 58 MBOs between 1977 and 1986, Smith (1990) also finds that operating cash flow per employee and the operating cash flow per dollar of book value of assets increased on average after an MBO due to better working capital management. She finds little evidence that the post-buyout cash-flow improvements are driven by cutbacks in discretionary expenses. The increases in operating cash flows were correlated with the buyout-induced changes in debt ratio and management ownership, suggesting that these organizational changes play an important role in value creation in LBOs.

Lichtenberg and Siegel (1990) examine post-buyout changes using plant-level data for approximately 1000 LBOs between 1981 and 1986. They find that, for LBOs during 1983-1986, plant productivity increased from 2% above industry mean in the three pre-buyout years to 8% above industry mean in the three post-buyout years[7]. Moreover, the authors show that this enhancement in economic performance is not attributed to reductions in R&D, wages, or capital investment.

Kaplan (1989), Smith (1990), and Lichtenberg and Siegel (1990) also investigate whether LBOs improved operating performance at the expense of workers. They find that the wealth gains from LBOs were not a result of significant employee layoffs or wage reductions (see Palepu (1993) for a detailed survey of these papers).

The topic of measuring fund-level PE performance has received quite a lot of attention recently. The seminal paper in this area is Kaplan and Schoar (2005). Based on a sample of 746 funds raised between 1985 and 2001, the study finds that the return of private

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engagement and governance. Our study has benefited from the experience of one of the co-authors in that earlier study.

[6] The change in operating income, however, is not controlled for post-buyout divestitures, which may lead the measured change to underestimate the true change.

[7] However, 1981 and 1982 buyouts did not experience significant productivity changes.

equity is close to that of the S&P 500, net of fees[8]. One of the most interesting and discussed facts that has come out of this literature is that PE performance is persistent. Kaplan and Schoar find that GPs whose funds outperform the industry in one fund are likely to outperform the industry in the next and vice versa. These findings are very different from those for mutual funds. In mutual funds, persistence has been difficult to detect and, when detected, tends to be driven by persistent under-performance rather than over-performance. In addition, Kaplan and Schoar also find that larger funds and funds with higher sequence numbers generate significantly higher returns, suggesting that the size and the maturity of the GP matters for performance. Overall, this evidence is suggestive that the mature GPs generate such value (even net of fees) through active ownership and governance, though convincing evidence in support of this has been elusive, perhaps due to lack of detailed deal-level data on their involvement with portfolio firms.[9]

The most recent wave of PE transactions (2001-2006) has, however, prompted researchers to re-examine whether buyouts are still creating value in this new era. Guo, Hotchkiss, Song (2007) try to answer this question with a sample of 89 US public to private transactions between 1990 and 2006. They find that gains in operating performance are either comparable to or exceed (by 2% with some measures) those observed for benchmark firms. In addition, returns are greater with a greater proportion of bank financing, and when there is more than one private equity sponsor involved in the deal. They also find that performance is related to the acquisition/divesture activities of the post-buyout firms, with asset sales reflecting poorer observed performance and larger acquisitions related to improved cash flow.

Finally, Lerner, Sorensen and Stromberg (2008) provide evidence that in contrast to the often-cited claim that private equity has short-term incentives, buyout deals in fact seem to engage in significant long-term innovation. They find that patents applied for by firms in private equity transactions are more cited (a proxy for economic importance), show no significant shifts in the fundamental nature of the research, and are more concentrated in the most important and prominent areas of companies' innovative portfolios. The last finding is

[8] Benchmark to S&P 500 implicitly assumes that beta of LBO funds is one. Jones and Rhodes-Kropf (2004) find that beta of LBO funds is 0.65, an issue that we revisit in our robustness checks. Phalippou and Gottschalg (2007) contend that Kaplan and Schoar's results are perhaps still overly optimistic. After correcting for sample bias and adjusting for overstated accounting values, they find that PE funds under perform 3% per year with respect to the S&P 500. Other studies confirm that, as an asset class, private equity has generated unimpressive returns (net of fees) for their investors (See Phalippou (2007) for a more detailed survey).

[9] An interesting question is whether the value enhancements are sustained after PE houses re-sell their investments. Cao and Lerner (2006) answer this question by studying the long-run performance of 526 reverse LBOs, which are initial public offerings of firms that had previously been bought out by PE funds. The study finds that, in the five years after they are re-sold, LBO firms outperform the market by approximately 0.5% per month on a risk-adjusted basis, suggesting that the value enhancements were sustained.

consistent with our conjecture that the substantial improvement in margins and efficiency in our sample of deals arises from a shift in focus from inefficient units to productive ones.

Evidence on buyouts in the UK: Several studies have examined PE investment in the UK, which has also experienced a tremendous increase in buyout activities in recent years. Nikoskelainen and Wright (2005) study 321 exited buyouts in the UK in the period 1995 to 2004. On average, these deals generated a 22.2% return to enterprise value and 70.5% return to equity, after adjusting for market return. They find that management ownership, number of participants in the equity syndicate, leverage, and debt coverage are positively related to value increase. They also find that operating improvements are related to organic changes rather than to divestments of assets or acquisitions.

In a related paper, Renneboog, Simons, and Wright (2007) examine the magnitude and the sources of the expected shareholder gains in UK public to private transactions from 1997-2003. They find that pre-transaction shareholders receive a premium of 40% and that the main sources of the shareholder wealth gains are undervaluation of the pre-transaction target firm, increased interest tax shields, and incentive realignment.

Harris, Siegel, and Wright (2005) study the productivity of management buyouts (MBO) plants in the UK. On average, plants involved in MBOs were less productive (-1.6% in the short and -2.0% in the long run) than other plants in the same industry *before* experiencing a buyout. However, MBO plants experienced a substantial increase in productivity *after* an MBO (+70.5% in the short run and +90.3% in the long run). These productivity gains are substantially higher than those reported in the US by Lichtenberg and Siegel (1990).

Overall, the literature suggests that buyouts do create value through operating improvements, in both US and UK markets, during both the recent and the 1980 buyout booms. Our contributions to this literature lie in providing a deal-level measure of value creation or out-performance, showing the critical role of EBITDA margin improvements in explaining the variation in this out-performance, and crucially, providing data on involvement of PE in portfolio companies through interviews with GPs and relating these to out-performance.[10]

[10] Our paper is silent about the conflicts of interest between private equity houses and their investors. Axelson et al. (2007), Ljunqvist et al. (2007) and Metrick and Yasuda (2007) provide a good coverage of theoretical as well as empirical issues on this front.

3. Data and description of the sample of deals

The deals in our sample represent relatively large UK companies, all greater than €100 million in enterprise value, acquired by twelve large and mature PE houses between 1996 and 2004. We required the deals be large in order to balance the intensity of data collection effort with the overall proportion of total value of PE companies in the UK. Currently, the data-set comprises 66 deals. The deals exited during 2000 to 2007, with the exception of five deals on which we elaborate below. Out of the 59 exited deals, there were 4 bankruptcies.[11] There were also 7 non-exited deals. For each deal, we have the exact structure of cash inflows and outflows from the standpoint of the PE house involved in the deal, detailed data on financial and operating performance, and ownership and board structure. Softer information on governance and operational changes brought about by the PE house was collected via interviews with one of the general partners (GP) from the PE house involved in the deal, each of which lasted for 45-60 minutes. We describe the interview-based data fields later in the paper. Returning to cash flows, for the unexited deals, since there isn't any exit cash flow from sale nor can it be deemed to be zero as in the case of bankruptcies, the end enterprise-value cash flow was simulated using the EV / EBITDA multiple at the start of the deal and applying that to 2006 year-end EBITDA.[12] We are continuing the data collection effort and expect our eventual sample size for the UK to reach 75-80 deals.

The deals in our sample have a median Enterprise Value (EV) at start of around €471 million. In particular, there are 18 deals with EVs above €1 billion, 15 in €500m- €1billion range, and the remaining 33 in €100m-€500m range. 29 of the deals have acquisitions and/or divestments (the so-called "inorganic" deals), and the balance of 37 are what we refer to as "organic" deals. The deals were held for an average of 3.8 years (46 months) by PE firms, typical of samples in many other studies as well.

INSERT TABLE 1 HERE.

Table 1, Panel A provides the sample breakdown by sector, start year and end year, and purchase and exit type. As expected, the sample represents deals in relatively stable cash-flow sectors. The sample is well spread-out across time although there is some concentration in 1999-2000 and 2002-2003 in terms of acquisition and in 2004-2006 in terms of exit. The

[11] The proportion of bankruptcies – 4 out of 59 – is typical of buyout data. Kaplan and Stromberg (2008) report an average of 6% of bankrupt deals in a large sample of buyouts since 1980.

[12] Our results are robust to alternative and more conservative assumptions on these un-exited deals, including one assumption that they produced no terminal cash flow whatsoever. However, we have verified that such a pessimistic scenario is unlikely to be applicable to these deals.

fall in deal number and flow during 2001 is due to the global recession and tightening of credit. The table also provides the breakdown by purchase source type; that is, by the form of corporate entity acquired in the deal: private company not in the hands of another private equity house; private company in private equity hands (a "secondary" deal); subsidiary of a public company; public company acquired in the whole; and, others. Note that, unlike the PE sector in the US, public to private transactions in the UK have been relatively fewer and our sample comprises around 9 whole company transactions and 23 transactions involving subsidiaries of public companies. The table also shows the breakdown by exit type: trade sale to another corporate; sale to another private equity house ("secondary"); IPO; bankruptcy; merger; and others. The first three categories constitute the bulk of the exits.[13] While it is not reported in the tables, 25 of our deals are identified to be "club" deals involving more than one private equity house.

Panel B provides additional summary statistics for the deals, in particular, the deal IRR based on cash inflows and outflows to private equity and the cash-out-to-cash-in multiple (the alternative measure of return employed by the industry); the entry and exit multiples on the transaction; and entry and exit leverage measured using debt to equity ratio as well as debt to EBITDA. All means are simple arithmetic means. Deals in our sample have high IRR and cash multiples. In particular, the mean (median) of IRR is 35% (31.0%) with significant outliers on either side. While a high value for average IRR is to be expected from a sample of deals from mature PE houses (Kaplan and Schoar, 2005), this does beg the question of how representative our sample is of the overall PE universe in the UK, and even within the funds of PE houses we focus on. We discuss this sample selection issue in greater detail below. The mean EV/EBITDA entry multiple is 9.6 whereas the exit multiple is 10.5, showing that the average deal improved its valuation by the market (consistent with the findings of Kaplan, 1989). The median debt to equity ratio at entry is 1.6 (debt to enterprise value of 60%). This is somewhat smaller than the usual LBO capital structure believed to be 70% debt and 30% equity (Axelson et al., 2008). The debt to equity ratio at exit is 0.6. Since the debt to EBITDA ratio does not fall as much (it goes from median entry value of 5.3 to exit value of 4.0), we conclude that the debt to equity ratio falls for PE deals during their life partly due to improvement in coverage ratio (D/EBITDA) but mainly due to the improvement in equity value over deal life.

INSERT FIGURES 2 AND 3 HERE.

[13] Kaplan and Stromberg (2008) report similar overall pattern of exits for a large sample of buyouts.

Coming to the sample-selection issue, Figure 2 provides several relevant comparisons. First, in terms of the number of deals in the UK over the sample period, our sample is clearly small. However, since we focus on large deals, we cover a higher percentage of deals by volume. In particular, the deals we exclude in the enterprise value range below €100mln constitute only 18% of the universe in value terms. The other two ranges – €100mln-€500mln and > €500mln – constitute 27% and 56% respectively of the universe (again, in value terms), whereas they constitute 16% and 84% of our sample. Ultimately, because we are studying the performance of large, mature PE houses, we have a sample with a large-size bias. In terms of number of deals greater than €100mln, we have about 30% of this sub-sample. It should be noted though that the large-size bias makes our sample more comparable to the benchmark group we employ, which consists of publicly quoted peers, the size of which is generally larger than a typical private equity deal in the entire universe of such deals.

Second, and perhaps more important, is the comparison of deal performance in terms of IRR to universe and its relevant parts. Here, we first need to convert our gross deal-level IRRs (before fees charged by PE houses to fund investors) to net IRRs (after fees, or in other words, IRRs from the viewpoint of fund investors). This is because the data we have on the overall universe is primarily in the form of net IRRs. To this end, we construct an artificial fund of our sample deals and calculate its IRR. The cash-flow structure of this pseudo-fund is illustrated in Figure 2. The top panel shows the time-structure of cash flows by number of deals and the bottom panel shows this by total cash inflow and outflow. The pseudo-fund starts in year 1996 and lasts for 12 years until year 2007; investments or cash inflows take place in years 1-9 (with small investments in years 10 and 11 as well); bulk of the investments occur in years 3-9; cash payouts start in year 5 and in last 3 years, the fund only has cash payouts. Using this pattern of cash inflows and outflows, we calculate the gross IRR of the fund. Next, we take out from the gross IRR a 1.5% annual fee and 20% carry for IRR above (the typical) benchmark of 8% market return. This net IRR for our deals is 24.7%.

The top quartile of all UK funds by IRR (based on British Venture Capital Association analysis) has a simple average net IRR of 20.2%. These funds are 1996-2001 vintage with performance measured over the period 196-2005. If we focus only on the specific funds from which our deals were financed, then 22 funds are 1994-2004 vintage whereas one deal is from a fund of 1989 vintage, and the exits are over the period 2000-2007. If we calculate a simple average of net IRRs of these funds, then the mean is 21.1% and the median is 21.4%. This illustrates that while we have a good representation of deals within the funds we have sampled in terms of median performance, our sample does have a 'right skew'.

While some of our results rely on average (out)performance, some others rely on their distribution *across* firms. Thus, while the first set is likely to be biased given the right skew

in performance, the second set of results may be somewhat immune, even if not perfectly so. Since our cross-sectional regression analysis employs simple averages across observations rather than weighted ones, the skew is likely to have somewhat less of a bite in affecting the results to follow. We also rely extensively on non-parametric evidence based on inter-quartile differences and patterns. Nevertheless, the right skew is evident and from a statistical standpoint somewhat problematic. Hence, we also perform our analysis by dropping the top four deals in terms of IRR, reducing our sample to 62 deals. As Figure 2 shows, with dropping of these deals, the net IRR of the pseudo-fund of remaining 62 deals is 21.6%, close to the mean net IRR of 21.2% funds the deals are part of. We find that dropping the "outlier" IRR deals does not alter the qualitative nature of our results.

4. Methodology

The key question we want to answer in this study is how much of the excess return generated by PE firms, relative to quoted peers, comes from pure financial leverage, and how much of it comes from genuine operational improvements. To disentangle the effect of leverage from the effect of operational improvements, we first calculate the IRR of the deal – its levered return – using the entire time pattern of cash inflows and outflows for the deal, as experienced by the PE house (before fees), and un-lever this IRR. Next, we benchmark this un-levered return to (similarly) un-levered return for the quoted peers of the deal. The residual un-levered return is what we call the "alpha" of the deal. Figure 1 provides the overall schematic of our decomposition of deal IRR into various components relating to leverage, benchmark quoted sector return and alpha.

Formally, to un-lever the levered return of deal *i,* denoted as $R_{L,i}$, we use the standard un-levering formula:

$$R_{U,i} = \frac{R_{L,i} + R_{D,i} * D/E_i}{(1 + D/E_i)} \qquad (1)$$

The un-levered IRR, $R_{U,i}$, corresponds to the return generated at enterprise-level. Since $R_{D,i}$ for each deal is not available, we assume that $R_{D,i}$ = 5% for all deals, which is our estimate of the average level of cost of debt in the market during our sample period. While the cost of debt for all companies in our sample is unlikely to be 5%, we have verified the robustness of our results to varying $R_{D,i}$ from 0% up to values of 7.5%. Note that higher values of $R_{D,i}$ result in greater un-levered return for the same levered return, generating a greater out-performance for the deal. The leverage ratio D/E_i of the deal is the average of the

entry and exit debt to equity ratio of the deal. Since the starting *D/E* is higher than exit *D/E* for most deals, the average pattern of leverage is one of decline over the life of the deal. Hence, we employ the average of the two. Finally, the un-levering formula (1) assumes that tax shields are as risky as profits of the firm. Given the high leverage of PE deals, this appears a reasonable assumption. Nevertheless, we have relaxed this assumption too and considered the variant of (1) where tax shields are deemed as risky as debt of the firm and assumed the marginal corporate tax rate of 33%. The results (available upon request) are overall robust to these different combinations of assumptions at the un-levering stage.

We also apply (1) to un-lever sector IRRs. In this case, a sector is defined as containing all quoted European "peer" companies with the same 3-digit ICB code in Datastream as the deal. In particular, we calculate over the life of each deal the equally weighted average of the annualized total return to shareholders (TRS) of these quoted peers of the deal, denoted as $R_{S,i}$. The weighted average of returns of these peers represents the benchmark – levered sector return, which we un-levered using (1) with the *D/E* for the sector being taken as the average over the period 1996-2007.[14]

After obtaining the un-levered returns, $R_{U,i}$,and $R_{SU,i}$, which are purged of the effect of financial leverage, the next key step is to measure the portion of PE excess return that is brought about by genuine operational improvements. We can employ for this purpose a factor asset-pricing approach and regress the un-levered return of each firm on the contemporaneous un-levered sector return as follows:

$$R_{U,i} = \alpha + \beta_S * R_{SU,i} + \varepsilon_i \quad (2)$$

Though in most of our analysis, we assume that β_S = 1 rather than estimating it, we describe our methodology more broadly and examine the implications of estimated β_S in our robustness checks (Section 6.2).[15] In particular, since we have only one IRR value for each deal, α and β_S are estimated only in the cross-section. In other words, the regression model implicitly assumes that each deal in our sample is a random draw from the PE universe which has identical but independently distributed portfolio companies with α and β_S

[14] Given this benchmarking to all quoted peers in Europe, we work with all cash flows and operational numbers in €, converting all £ figures into € at the exchange rate applicable in that year. Note, however, that for most of our variables of interest, the currency is not as relevant since they measure percentage annual changes.

[15] Note that equation (2) employs returns rather than returns in excess of the risk-free rate. This assumption does not affect results when beta is assumed to be one since it drops out from both sides of equation (2). When beta is estimated in Section 6.2, the assumption is not innocuous but the impact is small for reasonable levels of the risk-free rate.

characteristics. β_S is a measure of correlation – the "beta" - between PE return and quoted public sector return. The intercept, α, captures the component of PE return that is not linked to industry-wide risks, and therefore can be considered an estimate of average, idiosyncratic *excess* return on the deal. The residual, ε_i, measures the under-/out-performance of each individual private equity deal relative to average PE out-performance α.

In essence, applying (1) and (2) allows us to make the following decomposition or performance attribution of each deal IRR:

(i) Deal-level "alpha" out-performance: $\alpha + \varepsilon_i$

(ii) Sector performance: $\beta_S * R_{SU,i}$

(ii) Leverage effect: $R_{L,i} - R_{U,i}$

The leverage effect $(R_{L,i} - R_{U,i})$ measures the total effect of leverage on deal return. More often, however, we are interested in measuring the effect of the additional leverage firms take on after they are purchased by PE. To get at the incremental effect of increased leverage, we re-write (2) in terms of $R_{L,i}$ as follows, where D/E_i and $D/E_{S,i}$ denote the deal and sector debt to equity ratios respectively:

$$R_{L,i} = R_{U,i} * (1 + D/E_i) - R_{D,i}$$

whereby

$$\begin{aligned} R_{L,i} &= \alpha * (1 + D/E_i) + \beta_S * R_{SU,i} * (1 + D/E_i) + \varepsilon_i * (1 + D/E_i) - R_{D,i} * D/E_i \\ &= \alpha * (1 + D/E_i) + \beta_S * R_{SU,i} * (1 + D/E_{S,i} + (D/E_i - D/E_{S,i})) + \varepsilon_i * (1 + D/E_i) - R_{D,i} * D/E_i \\ &= [(\alpha + \varepsilon_i) * (1 + D/E_i)] + [\beta_S R_{SU,i} + (\beta_S R_{SU,i} - R_{D,i}) * D/E_{S,i}] + [(\beta_S R_{SU,i} - R_{D,i}) * (D/E_i - D/E_{S,i})] \end{aligned}$$

(3)

The above model allows us to make the following alternative decomposition of each deal IRR:

(i) Deal-level alpha out-performance: $\alpha + \varepsilon_i$

(ii) Leverage amplification on alpha (up to deal leverage): $(\alpha + \varepsilon_i) * D/E_i$

(iii) Sector performance including leverage amplification (up to sector leverage):

$[\beta_S R_{SU,i} + (\beta_S R_{SU,i} - R_{D,i}) * D/E_{S,i}]$

(iv) Deal-leverage amplification on sector performance (from sector to deal leverage): $(\beta_S R_{SU,i} - R_{D,i}) * (D/E_i - D/E_{S,i})$

The *deal-level alpha out-performance* $(\alpha + \varepsilon_i)$ measures the excess asset return generated at enterprise level of the portfolio company for PE investors, and it is purged of the effect of leverage financing the firm takes on. *Leverage amplification on*

alpha $(\alpha + \varepsilon_i) * D / E_i$, on the other hand, captures the amplification effect the deal leverage has on enterprise-level out-performance. This can be considered as the effect of financial leverage on the return that arises due to operating strategies (risks) undertaken by the firm. In some of our results, we break this up further into the effect of leverage up to that of the quoted sector ($D / E_{S,i}$), and the incremental effect of leverage of the deal beyond the sector leverage ($D / E_i - D / E_{S,i}$).

Next, *Sector performance including leverage amplification* $[\beta_S R_{SU,i} + (\beta_S R_{SU,i} - R_{D,i}) * D / E_{S,i}]$ measures the effect of contemporaneous sector returns, including the effect of sector-level leverages. Finally, the *deal-leverage amplification on sector performance* $(\beta_S R_{SU,i} - R_{D,i}) * (D / E_i - D / E_{S,i})$ captures the effect that incremental deal leverage (over sector leverage) has on sector returns. Finally, purely for reporting purposes, we separate the sector performance into market performance and incremental sector performance by simply subtracting the annualized market return over the life of the deal from $[\beta_S R_{SU,i} + (\beta_S R_{SU,i} - R_{D,i}) * D / E_{S,i}]$.

The purpose of performing this decomposition or return attribution is three-fold. First, it is to see if the sample deals from mature PE houses generated a significant, average alpha or not. Second, if we believe this alpha is the return to operating strategies and changes attempted by the PE houses, then what is the cross-sectional distribution of this out-performance? And, third and perhaps most important, is there evidence that at the level of individual deals, alpha is related to (i) business cycle; (ii) leverage; (iii) actual measures of operational improvements; and, (iv) nature of engagement by the PE houses?

Sections 5 and 6 below provide empirical results of this exercise. Section 5.1 documents average alpha and its cross-sectional distribution; Section 5.2 documents operating performance of deals and their relationship to alpha; Section 5.3 documents the interview-based data on PE engagement and its relationship to alpha; finally, Section 6 provides robustness checks of methodology to derive alpha and also evidence on how alpha is related to sector downturns and deal leverage.

Before we proceed to discussing our results, it is useful to note some of the limitations of our methodology. First, it treats leverage as purely financial gearing rather than having some incentive effect. We discuss this point more in Section 6.1. Second, our methodology is subject to the usual problems associated with IRRs, that they are a way of discussing cash flows rather than being actual realized returns and that they translate into returns only under extreme assumptions of constant and common interest rates and reinvestment rates. Another approach we adopted was to calculate a profitability index for each deal where we use the benchmark sector return to discount all cash flows and then

calculate the ratio of discounted cash flows to the largest cash inflow for the deal (in the spirit of Kaplan, 1989). This measure leads to similar conclusions as those based on IRR and the results are available upon request. We chose to use IRR given its simplicity and also that of its decomposition into various components. Finally, since we do not have the exact cash payouts on debt, we are unable to employ the methodology of Kaplan (1989), which is to simulate the enterprise-level (not equity) cash flows that would be obtained by investing these cash inflows in the quoted sector and examining the cash outflows thus generated. Hence, we start with equity cash flows and implied IRR.

5. Results

5.1. Alpha out-performance and its characteristics

INSERT TABLE 2 HERE.

Table 2, Panel A summarizes the results from employing the decomposition method of Section 4 to the data on our 66 UK deals and the sample of 62 deals which excludes the four outlier deals. We find that out of the average IRR of 35.6% for all 66 deals, sector risk and leverage amplification on it account for a total of 16.1%. That is, less than 50% of the total return is attributable to sector-picking ability of PE houses or simply to pure luck, the rest being deal out-performance. Of the remaining 19.5%, alpha constitutes 9.0% with total leverage amplification on top of it being 10.5%. Interestingly, since quoted sectors have little leverage on average (just 20% *D/E* ratio), most of the leverage amplification (9.3% out of 10.5%) is due to deal leverage, above and beyond the sector. Since the leverage amplification on alpha would not produce any return if alpha were zero, the combined effect we attribute to out-performance of the deal is 19.5%. The average alpha of 9.0% is statistically significant (t-statistic of 3.2), confirming that large, mature PE houses do generate higher (enterprise-level) returns compared to benchmarks and not all of these returns are attributable to sector exposure and financial gearing. The medians tell a similar story, although out-performance – the combined effect of alpha and leverage amplification on top of alpha – is somewhat smaller.

The table shows that these conclusions are not substantially affected by dropping the four outlier deals. For the sample of 62 deals, average alpha is 7.3% (also significant, though not reported) and leverage amplification on this alpha is 5.8%. Together, the alpha and its amplification from leverage constitute around 45% of the average IRR for this sample of 29.3%.

Panels B and C show how alpha is distributed across various deal types for the sample of all 66 deals. Alpha is substantially higher at 14.3% for club deals (25 in all)

compared to 5.7% for non-club deals (41 in all); there seems to be no monotone relationship between alpha and size, with medium-sized deals in the range of €500mln-€1bln generating higher alpha of 11.1% compared to the deals below €500mln and above €1bln. Finally, public carve-outs have the highest alpha of 14.5%; secondaries acquired from other PE houses being next with an alpha of 10.3%; and, somewhat surprisingly, the public-to-private transactions being the worst with no alpha. Interestingly, all of these source types have on average high IRR, in excess of 30%. The alpha being lower for public to private transactions of whole companies, suggests that their high IRRs are primarily due to sector-picking or luck, and its amplification due to financial leverage. It should be noted, however, that given our overall sample size, these finer partitions are even smaller in terms of sample size and hence the alpha distribution across the partitions must be interpreted with caution. Hence, we do not analyze such fine partitions of our sample in the analysis to follow. In terms of exit type, alpha is the highest for trade sales (17.2%), followed by IPOs (12.4%) and secondaries (9.1%). The four bankruptcies have an average alpha of -30.7% and play a significant role in lowering overall sample alpha.

Note that the PE industry is generally used to stating the performance of deals simply in terms of IRR (and sometimes, in terms of cash-out-to-cash-in multiple). Hence, we study briefly the relationship between alpha and IRR. We find that

$$\text{IRR} = 23.0\% + 1.4 * \text{Alpha}, \; R^2 = 52\%. \quad (8.3)$$
$$(\text{t-stat} = 5.5)$$

Thus, alpha and IRR are positively related but the association is far from perfect as revealed by the moderate R^2. Indeed, if we sort our deals into quartiles based on IRR and separately based on alpha (see Panel D which shows number of deals in each IRR and alpha quartile and their intersections), then only about half of the deals end up in the same quartile based on both classifications. This distinction between IRR and alpha becomes significant later when we assess the performance of different deal types based on their operating strategy.[16]

[16] In unreported results, we find that while the top IRR quartile has a significant contribution from all four components described in Section 4, the top alpha quartile has the least Sector contribution of the four quartiles. In fact, it is the lowest alpha quartile that has the highest Sector contribution to overall IRR. Across both highest and lowest quartiles, however, the effect of leverage is clear: Substantial financial leverage of PE deals contributes significantly to IRR, both by amplifying alpha when it is positive and negative (indeed often wiping out entire positive contribution of Sector effect when alpha is negative). This is perhaps suggestive of the strong incentive effect leverage can have on management and GPs involved in these deals as they attempt to create value through operational changes, an issue we have side-stepped for now but which we visit in Section 6.1.

5.2. Operating performance

INSERT TABLE 3 HERE.

The next step in our analysis is to see if alpha out-performance is related to operating out-performance at the enterprise-level. Table 3 provides an overall summary of operating performance of deals in our sample. At the top, the table shows the compound annual growth rate (CAGR) during the life of the deal in sales or revenues, EBITDA, FTE employment, and profitability measured as EBITDA per FTE, and the average annual percentage point increase in EBITDA to Sales ratio (margin). The table also reports the statistics for organic deals – those that exclude significant acquisition or divestment activity – since the balance-sheet numbers may get artificially inflated or deflated in the presence of such activity.

In terms of revenues and EBITDA, the average growth is substantial, the CAGR being 10.0% and 10.2%, respectively. The average annual percentage point growth in margin is 0.3%. Whilst profitability (EBITDA per FTE) has a CAGR of 11.6%, we were somewhat surprised to find that the average employment CAGR is *positive* at 1.6%.[17] While there is again substantial variation in all these operating statistics across deals, they immediately seem to counter two myths about PE deals prevailing in the media: it does not seem that PE deals in our sample are asset-strippers since they show substantial growth in revenues and EBITDA over their life; it also does not seem that PE deals in our sample cut jobs on average – while the growth rate in employment is modest, the gains in profitability appear substantial. The medians as well as the statistics for the organic sub-sample – where we exclude deals with acquisitions and divestments – tell a similar story. The organic deals have lower growth in sales of 7.4% CAGR compared to the overall sample, but grow EBITDA faster at 9.0% CAGR and have higher profitability improvement of 12.0% CAGR in EBITDA per FTE.

In the bottom six rows, the table shows the summary for capital expenditures (CAPEX), selling, general and administrative expenses (SGA) and Fixed Assets, and in each case, the ratio when divided by Sales. The data on these fields were available for a smaller sample and hence we do not divide it any further into sub-samples. CAPEX and Fixed Assets both grow on average, again refuting the asset-stripping criticism of PE. SGA rises too. Perhaps more interestingly, the ratios of SGA to Sales and Fixed Assets to Sales, have a negative CAGR over deal life (by mean or by median) and CAPEX to Sales has a small positive mean and median CAGR. Taken together, these summary statistics already

[17] In another study, Amess and Wright (2007) examine the effects of UK LBOs on wages and employment. Interestingly, the authors find that LBOs have an insignificant effect on employment growth but have a lower wage growth than non-LBOs.

cautiously point toward *productive growth* – an improvement in efficiency of capital usage and reduction in overheads at companies during their private phase, accompanied by, and/or resulting in, growth, improved margins, and profitability.

5.2.1. Operating performance and alpha

INSERT TABLE 4 HERE.

Next, in Table 4, we relate the operating performance of deals to that of their quoted peers over deal life. This helps us evaluate *operating out-performance.* Table 4 also reports the operating performance of deals and quoted peers for alpha quartiles to help understand how operating out-performance is linked to return out-performance measured by alpha. Panel A focuses on all 66 deals, and Panel B excludes the four outlier deals.

Focusing first on average operating out-performance, Panel A shows that PE deals, on average out-performed there sector peers in terms of revenues and EBITDA CAGR's by 4.3% and 2.0%, respectively, while the percentage point increase in margin was 0.2% higher. The median difference is higher for revenue and EBITDA CAGR's, and weaker for margin. Statistically, average revenue and EBITDA CAGR are significant for PE deals as well as for quoted peers, but only revenue growth is statistically higher for PE deals (EBITDA being insignificant). In contrast, average margin improvement is statistically insignificant for PE deals as well as for quoted peers. Results are similar when we exclude deals without acquisitions and divestments, although we don't report these. The weak statistical significance of margin changes could either be a feature of data, or a proxy for substantial cross-sectional heterogeneity in deal performance. We acknowledge the limitation thus induced in comparing averages as we have done so far. In fact, we will exploit the cross-sectional heterogeneity in results that follow in order to understand *within* deals, which operating out-performance metric is best related to alpha.

The non-parametric relationship across alpha quartiles between operating performance relative to quoted peers exhibits several interesting patterns. First, the top alpha quartile deals are not in under-performing sectors – the quoted peers of these deals have revenue and EBITDA CAGR's of around 10.3% and 14.8%, respectively. The top alpha deals, however, generate somewhat higher revenue growth at 13.1% CAGR, but much higher EBITDA growth of 21.7% – evidence of these deals growing more productively or profitably – which is also reflected in a substantial improvement in margin of 1.4% p.a. compared to the sectors' no improvement in margin. In essence, top alpha deals succeed by operating at better margins in fast-growing sectors. Second, the bottom alpha quartile deals tell somewhat of a converse story: they grow faster than their moderate-growth sectors in terms of revenues, but

have much weaker EBITDA growth, and correspondingly, a decline in margin compared to that of quoted peers who experience a small increase in margin. Finally, the second quartile appears a weaker version of the top alpha quartile, and the third quartile a better version of the bottom quartile. Panel B shows that these patterns exist even after outliers are dropped. The operating out-performance of top alpha quartile relative to quoted sector is in fact more pronounced in this sample.

While improved operating performance during the private phase of the deal would be a natural candidate to generate greater return out-performance as measured by alpha, the deal could also be rewarded at its exit if such improvements are perceived to be sustainable. To this end, we also report in Table 4 the average start and exit EV/EBITDA multiples for deals in the alpha quartiles and corresponding multiples also for quoted peers. On average, the start EV/EBITDA multiple is higher for deals by 0.3 compared to peers, whereas the exit multiple is higher by 1.4, showing an improvement in deal valuation *relative* to peers. The across-quartile variation provides useful information. Deals in the top two quartiles experience an improvement in multiple while their sector multiples fall, and the exact converse is true for deals in the bottom two alpha quartiles which experience a decline in multiples when their sector multiples stay unchanged, or experience no change in multiples when sector multiples improve. Panel B shows that these results are much the same for sample without outliers.

There are two possible interpretations for this result on multiples and they are difficult to separate. The first explanation is that top two quartile deals are "well" acquired in terms of price paid by PE houses and they experience improvement in valuation due to operating out-performance during the private phase relative to quoted peers, whereas the bottom two quartile deals were simply bought at highly expensive multiples and operating performance did not live up to the improvements built into these valuations. The second interpretation is that PE houses paid a fair price on all deals (as we believed is more plausible for mature PE markets like the UK) and that any improvement in multiple relative to sector is a reward for sustainable operating out-performance. In analysis to follow which links alpha to operating improvements, we take the conservative approach that improvement in multiples is due to ability to buy well or sell well, and investigate the link after controlling for any improvement in multiples.

5.2.2. Effect on employment and profitability

INSERT TABLE 5 HERE.

Table 5 shows the employment and profitability for PE deals relative to the quoted sector, on average, as well as by alpha quartiles. Based on Panel A for the overall sample, in

average terms, PE deals grow employment at 1.6% (median 1.2%) CAGR compared to 2.7% (median 1.8%) CAGR in the quoted sectors, but EBITDA per FTE, or profitability, at 11.6% (median 8.5%) CAGR, substantially higher than 5.9% (median 2.9%) in quoted peers. The difference in employment growth is statistically insignificant in both cases whereas the difference in profitability growth is marginally significant with a t-statistic of 1.7. The differences between PE deals and quoted sectors in employment growth and profitability growth get larger when focusing on organic deals (rightmost columns in both panels): Employment grows less rapidly at organic PE deals relative to quoted peers but profitability improves more.

In terms of pattern across alpha quartiles, there isn't an entirely monotone relationship in employment growth across quartiles or in the growth relative to sector. The top quartile deals grow their employment noticeably faster than quoted peers, something that would be necessary to achieve their higher sales growth documented in Table 4. In contrast to employment growth, profitability growth has a somewhat more monotone pattern, with top two quartiles having substantially higher growth than quoted peers, third quartile growth being somewhat higher (especially when restricting attention to organic deals), and the bottom quartile having lower profitability growth than peers. Finally, the average patterns as well as across-alpha patterns are borne out similarly in Panel B showing the sample without outliers. Overall, non-parametric inference based on Table 5 suggest that a measure of economic efficiency – profitability or productive growth – correlates better with alpha out-performance compared to the measure of employment.

5.2.3. The role of margin improvements in explaining cross-sectional variation in alpha

INSERT TABLE 6 HERE.

Having documented the relationship between alpha and several operating performance metrics (relative to quoted peers), we investigate parametrically in Table 6, Panel A which of these relative operating out-performance measures explains best the cross-sectional variation in alpha. Specifically, we regress alpha, the measure of return out-performance relative to the sector, on CAGR of revenue, EBITDA and EBITDA to Sales margin, all relative to the sector. We include duration and size of the deal as additional controls along with dummy variables for whether the deal had significant acquisition and divestment activity. The results are reported row-wise for different specifications. We find that out of the three measures of operating out-performance, the only one that shows up as being a significant determinant of alpha is the CAGR of margin relative to that of sector. The only other variable that shows up as significant is the duration of the deal, which has a

uniformly negative and significant effect. This is likely an artefact of IRR being employed to measure return on the deal since the IRR would be lower for longer-maturity deals. The *R-squared* in the regression with CAGR of margin relative to sector is 29%.

As discussed before, PE houses may have been lucky on some deals simply because they bought them cheap or managed to sell them well. In order to control for this effect, we compute three measures: (1) *Multiple expansion,* defined as the difference in EV/EBITDA multiple of the deal between exit and entry times, relative to this difference for the quoted sector; (2) *Buy-well,* defined as the EV/EBITDA multiple of the quoted sector in acquisition year of the deal minus the multiple for the deal at acquisition; and, (3) *Sell-well,* defined as the EV/EBITDA multiple of the deal at exit minus the multiple for the quoted sector at time of exit. If the deal was acquired cheap or sold at an attractive price, then these three measures would capture such a beneficial effect to the PE houses. We add these variables to the regression specification that employs the CAGR or margin relative to that of sector as the operating metric employed to explain alpha. We find that multiple expansion, buy-well and sell-well do contribute to alpha in that their effects are positive and significant. However, the effect of CAGR of margin relative to sector is little affected; it remains significant and is of equal magnitude as without these controls, and with buy-well and sell-well, in fact higher. In terms of economic significance, the coefficient on margin CAGR of 0.53 in the specification with buy-well and sell-well implies that a one standard deviation variation in margin CAGR relative to sector (15.6%) implies a cross-sectional variation in alpha of 8%, which is of the order of mean alpha in our sample. In other words, the effect of margin CAGR relative to sector is economically significant.

In Panel B, we study the cross-sectional determinants of IRR and find that IRR is explained not only by margin growth relative to sector but also by absolute margin growth and in fact also by absolute EBITDA growth. Panel C shows that the power of margin growth relative to sector in explaining alpha and IRR is robust to exclusion of the four outlier deals. Here, we report estimates only when multiple expansion, buy-well and sell-well are employed as control variables. Finally, it is possible that specific entry or exit points for PE deals in our sample corresponded to availability of cheap debt financing, a phenomenon believed to be at work especially for PE deals struck during 2003 to mid-2007. Since we assumed a common debt financing cost of 5% for all our deals while calculating alpha, in Panel D, we control for entry year and exit year of a deal as additional control variables in the specification to explain alpha with buy-well and sell-well. In particular, for entry year, we employ dummies for the periods 1996-98, 1999-2000, 2001-02, and 2003-04 based on acquisition year of the deal. The period 2001-02 is the only recessionary period in our sample. The second estimation employs dummies for the exit year of the deal, for year 2000, 2001-02 and 2003-07.

The estimates in Panel D show that the effect of margin growth relative to sector is little affected by time dummies for entry and exit years. Also, there is not much evidence that the alpha of deals was much lower during the 2001-02 recessionary period (by acquisition or exit year) compared to other periods. The only substantial difference appears to be in the last period (2003-04 by acquisition year and 2003-07 by exit year) where alpha has fallen significantly compared to other periods. Since the fall in alpha appears to be the same for acquisitions as well as exits during these periods, it does not seem attributable to exits of deals struck in the 2001-02 period. It is more likely attributable to the somewhat high valuation multiples paid by PE houses over 2003-07 (Acharya, Franks and Servaes, 2007; and Kaplan and Stromberg, 2008), though in principle this effect should be captured (at least partly) also in buy-well and sell-well measures for the deal.

We consider the finding that, it is improvement in margins relative to sector that distinguishes good deals from others in terms of value creation in the deal, as an important result: it provides insight into the operating strategies that might be at play in different PE deals and thereby offers a lens to isolate those strategies that lead to greater out-performance. We explore this theme in Section 5.2.5.

5.2.4 Performance during sector downturns

INSERT TABLE 7 HERE.

Another way of assessing the systematic risk of PE deals is to examine their performance during sector downturns. While the flow of capital into PE funds is clearly cyclical (Kaplan and Stein, 1993; Acharya, Franks and Servaes, 2007; Kaplan and Stromberg, 2008), this does not necessarily imply that the performance of PE companies is also cyclical. Table 7, Panel A examines the set of 11 deals for which the quoted peers had a negative total return to shareholders over deal life. In particular, the panel reports the return attribution to alpha, sector and various leverage effects for these 11 deals, based on the methodology of Section 4. The results are striking. Since sectors are under-performing for these deals, their contribution to deal returns is in fact negative. The alpha for these 11 deals is 17.8% on average, almost twice the alpha for the overall sample (Table 2, Panel A). The alpha itself almost wipes out the negative return contributed by the sector (including deal leverage amplification of the negative return), but the deal leverage amplification on alpha is around 27.1% and contributes almost the entire IRR of 27% of these deals on average.

In other words, PE deals in sectors affected by downturns do even *better* than PE deals on average, a feature in terms of their out-performance. This is consistent with the perceived wisdom that PE deals on average tend to involve firms that have stable cash flows

relative to their peers and thus most likely lower systematic risk than the quoted peers. For the sake of completeness, we also report in Panel B the operating performance of these 11 deals and their quoted peers. The results are qualitatively similar to overall operating performance of PE deals in our sample, and for almost all measures, operating performance for the 11 deals in sector downturns is far superior compared to their sectors as well as compared to the overall PE deal sample: these deals grow their revenues as well as earnings faster and at better margins, have lower employment growth than the sector but are much more profitable per employee, and cut CAPEX, SGA and Fixed Assets when measured relative to Sales. All these characteristics suggest pursuit of productive growth which enables these deals to withstand sector downturns better than their quoted peers; in fact, these deals seem to thrive on such downturns in terms of out-performance relative to quoted peers.

5.2.5. Uncovering operational strategy of out-performing deals

INSERT TABLE 8 HERE.

To unravel the operating strategies at work in PE deals, Panel A of Table 8 first provides the IRR, cash-out-to-cash-in multiples and alphas for "organic" deals – that is, deals without any significant acquisition or divestment activity – and "inorganic" deals – the deals with acquisitions ("roll-ups") and deals with divestments. 37 of our 66 deals are organic in this respect, 16 are roll-ups and 13 have divestments. Overall, in terms of both IRR and alpha, the organic deals have done the best; they have an IRR average (median) of 47.1% (40.3%) and alpha average (median) of 15.3% (14.3%). The divestment deals do the worst; they have low IRR as well as negative alpha. The roll-ups, in contrast, have an impressive average IRR of 30.0% though the average alpha is just 3.8%, the corresponding medians being 33.5% and 2%. The top and the bottom set of numbers in Panel A show that these patterns are robust to exclusion of four outlier deals.

There are several factors that might be at play here. First, acquisition and divestment deals take longer than other deals; in our sample, these deals take 4.53 years (54 months) on average, compared to the overall mean duration of 3.84 years (46 months) and mean duration of 3.3 years (40 months) for organic deals. The longer duration would penalize the performance of inorganic deals since we focus on IRRs as a measure of performance. This is reflected in the fact that cash-out-to-cash-in multiples for acquisition deals are in fact highest at 3.3, followed by organic deals at 2.9. [18] Divestment deals, in contrast, appear to perform the

[18] However, when we convert the cash-out-to-cash-in multiple into an "alpha" based on similar methodology as in Section 4 (details available upon request), organic deals fare better in spite of their lower starting multiple relative to roll-ups. This is reflected in Table 8, Panel A in the alpha cash-

worst on all counts and thus the duration argument does not help explain their relatively poor performance. Their poor performance might be due to the fact that asset sales are perhaps symptomatic of weak deals. Second, the operating performance of organic deals was nonetheless found to be superior to inorganic deals in Tables 3-5. This blunts partially the criticism that poor performance of acquisitions relative to organic deals in terms of alpha is simply due to employing IRR as a measure of un-adjusted performance from which alpha is extracted. Third, our deals are relatively large and acquisitions might be more beneficial in smaller deals where diseconomies of scale and scope kick in less easily. Finally, another possibility is that roll-ups might create value by changing the strategic positioning of the industry in terms of market concentration, but that the value arising from such changes accrues also to their quoted peers. Hence, even if roll-ups have substantial IRRs, their alpha out-performance *relative* to peers may not be significant. However, note that our sectors are defined broadly at the 3-digit ICB level, whereby it is somewhat unlikely that the returns for the whole sector are expanding due to consolidation resulting from the roll-ups in our sample.

To understand what drives the high alpha of organic deals, we employ our identification in Table 6 of the critical role played by margin improvements. In particular, in Table 8, Panel B we divide our organic deals into four partitions: (i) "revenue-only" deals, that grew their revenues relative to that of quoted peers but not their margins; (ii) "margin-only" deals, that grew their margins relative to that of quoted peers but not their revenues; (iii) "margin-and-revenue" deals, that out-grew their sectors in terms of both margins and revenues; and, (iv) others.

Panel B shows that out of 34 organic deals, 10 are revenue-only deals, 7 margin-only deals, 13 margin-and-revenue deals, and 4 others. Margin-only and margin-and-growth deals significantly out-perform the other two partitions, both in terms of IRR and alpha. Margin-only deals are less frequent, but do slightly better than margin-and-growth deals. Almost the entire average alpha of 12.1% stems from these two deal strategies. Interestingly, the revenue-only deals have a substantial IRR on average of 38.3%, comparable to the average IRR for organic deals of 45.7%. However, these deals have a low average alpha of 4.9%. This lack of out-performance of growth-only deals illustrates that not all growth creates value relative to the sector, especially growth that occurs simply due to riding on a sector's upturn; this generates IRR but not alpha and hence cannot be attributed to value addition by the PE houses. The "other" deals do the worst in terms of IRR as well as alpha. The four outlier deals are split as one revenue-only deal, one margin-only deal and two margin-and-revenue deals. Their exclusion does not alter conclusions substantially; margin-only deals stand out a bit more compared to margin-and-revenue and revenue-only deals.

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multiple, which is 0.9 on average for organic deals, in contrast to -0.1 for both acquisitions and

INSERT TABLE 9 HERE.

The successful strategies also bear out in their operating out-performance as shown in Table 9, Panel A. The margin-only deals shrink their revenues when the quoted sector is growing, but improve their margins by an impressive 3.7% p.a. compared to quoted peers' -1.0%. Not surprisingly, these deals reduce their employment by 3.9% CAGR when the peers are growing it at 10.0%, but improve their profitability (EBITDA per FTE) by 21.9% CAGR when the peers see it grow by just 0.5%. The margin-and-revenue deals, which are greater in number than the margin-only deals, out-pace their sector on all fronts: growth in revenue, EBITDA, margin, profitability and employment. However, in contrast to margin-only deals, their absolute margin improvement is small (0.9% p.a.) relative to that of peers of -0.3%. Revenue-only deals have greater growth in revenue and employment relative to sector, but worse profitability and margin changes, whereas the "other" deals have lower growth in revenue as well as margins and as such slash employment the most. The average effect across these various organic strategies is of slower employment growth, but faster revenue, earnings, margin and profitability growth, consistent with our earlier results for the overall sample.

In Panel B, we compare the annualized operating performance of these strategies over deal life not to the respective sectors but to the performance in the very first year of the deal. The most revealing feature of data here is that margin-only deals realize much of their percentage point increase in margins in the very first year, or in other words, they have a turnaround or "shock therapy" aspect to them. We believe this most likely occurs through closure of inefficient units since there is a substantial first year reduction in headcount of 28.4%. A similar feature exists also for margin-and-revenue deals which improve their margins also in the first year, do not produce much margin change thereafter, but they capitalize on this with substantial growth especially in the first year but all through the deal (most likely through expansion to new customers and geographies, as we unearthed through interviews). The average effect across different organic strategies is to shrink employment by 6% in the first year, but growing it by 1.0% CAGR by time of exit; producing a substantial 3.5% margin improvement in the first year compared to average improvement over the deal of 0.7%; but growing in the first year at roughly the same pace in terms of revenues and earnings as over the rest of the deal. This focus on profitability or efficiency in the early phase of the deal is consistent with the findings of Davis et al. (2008) who find that for LBOs in the United States from 1980's to date, there is a reduction in the number of jobs at existing plants in the years immediately after acquisition, but that this reduction is substantially but not fully offset

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divestments.

by creation of new jobs at new plants within two to three years after acquisition. Davis et al. call this as "creative destruction", a phenomenon of shutting down inefficient plants but creating more of efficient plants eventually, and it corroborates our overall theme of PE deals on average striving for productive growth – that is, growth with enhanced efficiency.

Finally, in Panel C, we document the change in EV/EBITDA multiples of these organic strategies relative to those of the sector from start to end of deals. Again, by this metric, the deals with margin improvements stand out. They start out with multiples that are below those of the sector but which are higher by exit time; moreover, while their multiples improve, the sector multiples decline. While one cannot entirely rule out the "buy-well" story applicable to these multiples, the fact that these deals do experience substantial margin improvements relative to the sector and have a high alpha out-performance, makes it more likely that the change in multiples is a result of the success and perceived sustainability of operating changes that occurred during the private phase of these deals. Note that the inorganic deals on average have a better expansion in multiples relative to the sector, when compared to such expansion for organic deals. This makes their lower alpha and operating out-performance even more striking.

5.3. Active ownership and governance

In this section, we provide evidence showing that the alpha out-performance achieved in PE deals correlates with active ownership and governance approach of PE funds and GPs involved with these deals. To start with, we provide in Figure 3 a schematic of the active ownership practices we found PE houses to deploy based on our interviews and conversations with them.

INSERT FIGURE 3 HERE.

Broadly speaking, these practices can be decomposed as: (1) due diligence during the phase prior to acquisition, which often involves intensive dialogue with existing board members, management and experts in the target company's domain; (2) drafting of value-creation ("100-day") plans that serve as the initial blue-print of a company's strategic and operational agenda for its life in private ownership; (3) early management changes in order to replace ineffective management and bring in others who can execute the value-creation plan efficiently; (4) provision of substantial, but focused incentives, using significant equity and options-based stakes for top management (and often even to other employees), requiring co-investment from top management and subjecting management to key performance indicators (KPIs); (5) investing significant GP time upfront, both in due diligence as well as the first 100

days, and by interacting with the CEO and CFO, often multiple times a week through formal as well as informal channels; and, (6) employing external support where required to strengthen the company's weak spots in operations, and to implement required changes. These practices constitute the most active phase of engagement by GPs involved with their portfolio companies, in the early phase. During the life of the deal, the value-creation plans are often refined based on newly acquired information, the top management team is monitored on a regular basis in terms of their performance through precise systems and processes, and plan deviations are reacted to immediately – operationally as well as through management changes – if necessary.

Since information on such practices is soft and not hard-coded in PE funds' documents, we conducted interviews to tabulate these changes and translate them into "governance scores" that we could relate to deal performance.

5.3.1. Governance scores

We conducted in-depth interviews with general partners (GPs) involved in our deals, essentially wherever the relevant GPs had not left the PE house in question. Based on these interviews, we identified 21 questions to which the answers implied either relatively active or inactive governance. Each response was awarded a score of either 1 (active) or 0 (inactive), and the 21 questions compiled into seven groups, each containing three related questions. Due to time constraints, not all questions were answered for all interviews. Hence, to correct for this, the subtotals for each of the seven groups were normalised by dividing the total score, ranging from 0 to 3, by the number of questions answered; the grand total, ranging from 0 to 21, was normalised by dividing it by the number of available sub-scores. The seven groups are as follows and also outlined in Appendix I:

(1) Changed top management within 1st 100 days (one point awarded for each of CEO; CFO; and Others);
(2) Launched multiple initiatives for value creation within 1st 100 days (one point awarded for one or more initiatives launched in each of the following categories: organic growth; productivity; and strategic repositioning);
(3) Shaped value creation plan (one point awarded for the following in the 1st 100 days: adjustments made to plan; new KPIs devised KPIs; one point also awarded for acting immediately on deviations at any stage during the deal);
(4) Provided management support in 1st 100 days (one point awarded for interacting with CEO more than once/week; one point for frequent interaction with CFO; one point for committing more than average GP time to deal, with average defined based on our sample);

(5) Provided strong incentives (one point awarded for providing management with more than average equity; one point for providing equity to at least CEO, 1st line and 2nd line; one point for providing management with greater than average cash multiple on hitting base case targets in plan);
(6) Created optimal board structure (one point awarded for below average board size; one for board comprising less than average percentage of NXDs; one point for different CEO and Chairman);
(7) Leveraged external support (one point awarded for engaging support in each of the following periods: due diligence; 1st 100 days support; after 1st 100 days).

INSERT TABLE 10 HERE.

Table 10, Panel A provides summary information on some of the sub-scores above that we found most interesting. A PE firm's typical board structure has about eight members, with 33% being PE staff (typically always the GP(s) involved on the deal), 43% from management team, and rest in the form of NXDs who are not PE staff. In 68% of the cases, there is at least one board meeting a month and in 92% of the cases the GPs have regular, informal interactions with the CEO in first 100 days at weekly or better frequency. The time commitment by the PE funds is impressive: The total FTE committed is 2.96 in due diligence (1.44 being from GPs), 0.73 during first 100 days (0.41 from GPs) and 0.41 (0.25) thereafter, suggesting that on average 1.5 GPs are involved with new deals whereas a mature deal has about one-fourth of a GP assigned to it. If we view GPs as NXDs of the board as well, then these time commitments represent highly intense engagement during the early phase of PE deals.

In terms of actual governance initiatives, Panel B shows that 39% (33%) of our deals have CEO (CFO) replacement in the first 100 days, and 69% (61%) have such replacement at some point during the deal. Incentive provision is high-powered as well: the PE house(s) own over 70% of deal's ordinary equity on average, with 14.6% of the remaining ordinary equity being employed for incentive purposes. The CEO is awarded on average 5.7% of deal's ordinary equity and the rest of the management team gets 8.9%. In terms of total equity (including preferred equity which is generally with the PE house), the CEO gets 1.2% and the rest of the management team 1.8%. The high-powered nature of incentives is also reflected in the fact that on average the top management get a cash multiple of 13.5 on their cash investment in the deal (almost always, there is co-investment) upon hitting the base case of performance laid out in the value-creation plan. Finally, external support/expertise is employed during the due diligence in 78% of the deals, in 29% during the first 100 days as well and in 42% at some point after the first year; 30% of the deals involve a major overhaul

of the portfolio company in the value-creation plan for the first 100 days with another 19% involving minor changes. Revisions to the value-creation plan occur infrequently, and rarely so during the 1st 100 days.

5.3.2. Governance and alpha

INSERT TABLE 11 HERE.

We are interested in knowing if variation in active governance across deals is linked to corresponding variation in enterprise-level out-performance of the deal. Table 11, Panel A provides preliminary evidence on how the governance scores vary across different alpha quartiles of deals for which we have these scores. While the scores for questions 2, 3 and 6 (launching and shaping value-creation initiatives and creating effective board) have little monotone pattern in variation across the quartiles, the scores for questions 1, 4 and 7 (changing management in 1st 100 days, providing management support and leveraging external support) correlate better, and the score for question 5 (providing strong incentives) correlates somewhat negatively. Though patterns are not always monotone across quartiles, by and large the first alpha quartile (the highest out-performance deals) achieves the highest governance scores, with the exception of scores for question 5 (providing strong incentives) where this quartile has the lowest score. Aggregating and averaging the seven scores gives an average score of 0.52 for first alpha quartile, 0.48 for second, 0.50 for third, and 0.45 for fourth, confirming that not all of the responses line up well with alpha. Below, we investigate the relationship between alpha and individual governance scores parametrically.

In Table 11, Panel B, we perform regression analysis that links these governance scores to alpha. The first set of results relates each score individually to alpha, whereas the second set reports the best regression obtained from employing several scores together. Both regressions control for duration and size of deals as well as for acquisition and divestment dummies. The advantage of the first set is that in each individual regression, we have at least 38 data points, whereas in the joint regression which requires different scores to be present in some combinations together, we have fewer data points for some combinations, reducing statistical power significantly. Across the individual and joint regressions, we find that alpha is explained best by the replacement of top management in the 1st 100 days and leveraging of external support. One replacement (CEO, CFO or others) contributes one-third of 10.0% to alpha which is roughly also a third of the size of average alpha (9.0%) for our sample. While this does not necessarily imply that changing management automatically leads to value creation, it is suggestive of the critical agency problem that may be unlocked by successful PE houses for value creation: turnover of entrenched management in PLCs; taking private the

inefficiently run subsidiaries of conglomerates – a process that generally requires a change of management in the spun-off units; professionalization of small family-owned businesses by bringing in executives with experience in large firms; and so on. Similarly, employing external support at some point during the life of the deal (due diligence, 1st 100 days or later) contributes 7% to alpha, which is of the order of magnitude of average alpha. Such external support is usually brought about to cut costs and improve process efficiency, which contribute to margin improvements, and are often not the focus of non-PE firms, as we explore below.[19]

5.3.3. Governance and operating strategy

In Table 12, we perform non-parametric analysis linking the governance scores to the "strategy" partitions we employed in Section 5.2.3. Although the sample size within each partition is too small to have much statistical confidence in the patterns, we find it promising, in light of our overall conclusions, that in Panel A, it is the margin-only and margin-and-growth deals (the highest alpha deals) that are associated with greater incidence (reported as % of deals within each partition) of senior management changes early on; changing management plan in 1st 100 days; revising in 1st 100 days the KPIs for assessing and incentivizing management; and, the provision of PE-house level and external support to top management, especially intense engagement from GP's on a more than weekly basis during the first year. Overall, this is supportive of value creation by top, mature PE houses, at least partly as an outcome of their active ownership and governance.

Appendix II lists the various value-creation initiatives that typically characterize the 100-day plan. We divided them into six productivity initiatives and six organic growth initiatives. Panel B of Table 12 shows that in terms of adoption of these initiatives, margin-only and margin-and-growth initiatives show greatest incidence. The two left boxes in Panel B show this by the average of six scores of 1 or 0 based on whether the deal involved various initiatives, and the right boxes show this as a percentage of six. Consistent with the earlier destruction of productive growth, the productivity initiatives are employed primarily in the 1st 100 days, whereas the growth initiatives are employed all through the deal, but with greater intensity in the 1st 100 days. Panel C and D show the incidence of adoption of specific

[19] We find that providing strong management incentives is negatively related to alpha, although the effect is weak statistically. There are two conflicting effects that may be at play here: (i) while strengthening of the management team through appropriate replacements in the early phases delivers performance, providing them with strong equity-based incentives and requiring them to co-invest does not; or, (ii) strong incentives are provided because weaker incentives would result in even lower performance. The second conclusion is due a problem of endogeneity and suggests that such "worst-case" deals are so risky in the end that strong incentive provision required to attract the managers and improve performance fails to improve them substantially enough to alter their performance relative to other deals.

initiatives in different partitions. Overhead reduction, other cost reduction (e.g., outsourcing) and CAPEX reduction are employed more heavily in margin-only deals, whereas purchasing and process efficiency and working capital reduction are employed more frequently in margin-and-growth deals. There is little focus on purchasing efficiency, cost reductions or CAPEX reduction in growth-only and inorganic deals. Similarly, exploring new channels, new products, new geographies and reviewing pricing seem to be part of value-creation plan in margin-only and margin-and-growth deals, whereas existing geographies (existing and new customers) are not so clearly different in plans of different strategy partitions.

Overall Table 12 helps get a better picture of the exact nature of operational engineering at play in the successful deals and also helps understand why leveraging external support correlates with alpha since such support is generally solicited for process efficiency and market-research based plans of expansion.

5.3.4. Private equity versus PLC model of governance

INSERT FIGURE 4 HERE.

In terms of overall governance mechanisms and modus operandi of boards, the set of responses in our interviews provides the following striking differences between the PE and PLC models of governance (see also Figures 4 and 5). For the PLC model of governance, we used data obtained from Spencer Stuart's 2005 Board Index for the top 150 firms in the UK, out of which we picked a size quintile that matched the average size of PE deals in our sample, and from Korn Ferry's 33rd Annual Board of Directors Study for publicly listed firms in the UK.

Figure 5 shows that PE boards are smaller than PLC boards by about two members. More importantly, non-executive directors (NXDs) in PLCs constitute about 50% of the board, the rest being corporate insiders, whereas in PE boards, management is about 43% but of the remaining 57%, 33% are PE staff (who are technically NXDs but very different as we argue below) and the rest being NXDs. The NXDs in PLCs have little exposure to cash flow risk of the firm on the upside as they have little, if any, equity or options-based compensation; they are perhaps more exposed to the downside reputation risk. In contrast, the PE houses own (or manage for their limited partners, to be precise) over 75% of the equity on average in their portfolio companies, the remainder being owned by management and employees (15%), other PE houses and limited partners (LPs) who co-invest in some deals. The PE houses are thus highly incentivized and empowered in terms of voting rights to effect substantial change at rapid pace. Given these strong incentives, almost 1.5 FTE GP time is spent by the PE house on deals they manage at the due-diligence stage and 0.4 FTE GP time during the 1st 100

days. The GPs engage through weekly, often informal meetings with the management during the due-diligence phase and the first 100 days when value-creation plans are set for the next 3-4 years. In contrast, PLC boards are more focused on governance compliance issues and less on value-creation strategies. PLC boards meet eight to ten times a year in formal meetings, with NXDs spending on average around 20 hours per month on firms they have board seats on. Top management in PE-run firms own around 15% of ordinary equity (CEO owns around 6%) in our sample and also co-invests, that is, buys the equity; such co-investment is rare in PLCs. Management in PE companies also face greater turnover risk. There is turnover in over 69% of our deals during the private phase, which implies an average tenure of about 2 years, whereas the average CEO service in PLCs is longer at around 4.7 years. Finally, cutting costs is an explicit part of the value-creation plan in many PE deals, especially during the 1st 100 days, whereas only 36% of PLC boards rate themselves as focused (and good) at cost reduction.

INSERT FIGURE 5 HERE.

Figure 5 is based not on our sample of 66 PE deals, but from a separate sample of interviews we have conducted for another study where we spoke to 20 executives who have been members of both PE and PLC boards of relatively large companies, with the view of ascertaining the differences in modus operandi of both.[20] We only provide a brief summary of the salient differences. First, top 3 board priorities in PE tend to be value creation (top priority in 89% of interviews), exit strategy (in 56% of interviews) and strategic initiatives (including M&A), whereas in case of PLC boards, these are governance compliance and risk management (top priority in 45% of interviews), strategic initiatives (also 45%) and organization design and succession planning. The main difference thus seems to be value creation focus of PE boards versus governance compliance and risk management of PLC boards, perhaps somewhat opposite to the extent that value creation may entail (judicious) risk-taking. On this front, PE boards see their role as "leading" the strategy of the firm through intense engagement with top management; in contrast, PLC boards see themselves mainly as "accompanying" the strategy of top management. A part of this difference may arise from the fact that PE boards report a high (in fact, 100%) alignment in objectives between executive and non-executive directors, whereas the PLC boards report lack of complete alignment and hence are often focused on management of broader stakeholder interests in firms. Finally, PE board members receive information that is primarily cash-focused (a feature consistent with high leverage in these deals) and undergo an intensive

[20] These interviews have been conducted along with Michael Reyner of MWM Consulting.

induction during the due diligence phase when the level of information provided to them about the companies is of high quality. In contrast, PLC board members collect more diverse information, report that this is of medium to high quality, and undergo a more structured rather than an intense induction to the board.

It is a fascinating theoretical and empirical question as to why these two forms of the modern corporation co-exist, and whether the "eclipse of the public corporation" suggested by Jensen (1989) is limited only by the scarcity of skilled GPs at mature, large PE houses.

Before concluding, we discuss a few robustness checks relating to our methodology for extracting alpha out-performance and how alpha is affected by leverage and recessions.

6. Robustness [TO BE COMPLETED]

6.1. Effect of leverage

Recall that the IRR attribution methodology of Section 4 attached no incentive role to leverage whatsoever. It simply employed average leverage over life of a deal to un-lever the equity return. Next, we investigate the relationship between the alpha out-performance of deals and their acquisition leverage to shed some light on the issue of relationship between deal performance and its leverage.

Table 13, Panel A shows the overall IRR performance and its attribution into alpha, sector and leverage components for deals that are formed into quartiles on the basis of debt-to-enterprise value ratios at acquisition. We form quartiles based on acquisition ratios since exit ratios are highly endogenous to performance of deals. Across quartiles, the acquisition leverage varies from 0.39 for quartile 4 to 0.72 for quartile 1 (that is, debt-to-equity ratios of 0.67 and 2.5, respectively). There is however no monotone pattern in either IRR or alpha across the quartiles. Quartile 2 has the highest IRR and quartile 4 the lowest, whereas Alpha is the highest for quartile 4 and next-highest for quartile 1. In other words, when sorted by leverage, IRR and alpha are negatively related to each other, but individually, each is non-monotone in leverage. We also examined whether the extent of leverage relates to downside risk of deals in our sample. The four bankruptcies of our sample belong to the low-leverage quartiles 2, 3 and 4 (two bankruptcies). The so-called "dog" deals which have negative IRRs are also distributed across quartiles: the low leverage quartiles 3 and 4 have the maximum number of dog deals (three each), followed by quartile 1 and quartile 2 which have two and one, respectively.

The panel also shows the distribution of leverage across alpha quartiles and for the various strategy partitions. The distribution across alpha quartiles corroborates that there is

no monotone pattern between leverage and alpha. Highest alpha quartile has the lowest starting D/EV ratio of 0.48, with lowest alpha quartile being the next with D/EV of 0.58. Note that average D/EV ratios between acquisition and exit are ranked well across alpha quartiles, the correlation being negative, but this is to be expected since best-performing deals would end up with lower D/EV ratios. Across deal types by strategy, there is just no variation in acquisition leverage. The average D/EV for each type (inorganic or organic, and within organic, margin-only, margin-and-growth, and growth-only) is remarkably close to the overall sample average. In fact, the "other" category of organic deals has the lowest starting leverage of 0.43 and these are in fact the worst-performing deals in terms of alpha.

To summarize, leverage does not seem to have a clear relationship with IRR, alpha or operating strategy. Table 13, Panel B shows the operating performance of deals in different leverage quartiles relative to their sectors. Here too, there is lack of any clear relationship. Higher leverage (leverage quartiles 1 and 2) seem to have higher revenue growth relative to quoted sector, but not necessarily productively so: EBITDA growth and margin improvements are not as well-related to leverage. In terms of multiples, higher leverage deals experience better expansion in multiples, but so do their sectors.

The most likely cause for these non-monotone relationships between leverage and performance is endogeneity, which may come from a few sources. First, it could be the case that deals that are difficult in terms of unlocking agency problems, providing incentives and engaging in operational engineering require greater use of leverage to overcome the difficulty. Second, it could simply be the case that PE funds target threshold levels of IRRs so that their funds can meet the expectations of limited partners and to capitalize on carry (which is based on IRR exceeding a hurdle rate). If this were the case, then low alpha deals would get high leverage gearing to simply achieve a higher equity return or IRR. Third, there is the mechanical effect that if IRR on two deals with different leverage turned out to be the same by sheer chance, then the un-levering formula in equation (1) attributes a higher alpha to the deal with lower leverage. All these explanations would induce a negative relationship between alpha and leverage. Confounding this relationship, however, is the fact that if leverage was high on some deals due to exogenous reasons (for example, due to a low cost of debt in benign credit-market conditions), then this "exogenous" component leverage, due to the attendant incentive effects, may have a positive effect on firm performance. While the resulting complexity in relationship between leverage and performance is intriguing and worthy of investigation, it is difficult to examine in a sample as small as ours. This is also the reason why we excluded leverage as an explanatory variable in the regression analysis of Table 6 linking alpha and IRR to deal characteristics and operating out-performance.

6.2. The risk of private equity firms relative to quoted peers

INSERT TABLE 14 HERE.

While implementing our methodology of Section 4 to calculate alpha out-performance, we assumed that each deal had the same risk as its quoted 3-digit ICB sector. In the notation of the methodology (equation 2), we assumed that β = 1 for all deals. This assumes that PE houses might pick specific sectors, but within sectors, a firm taken private is of the same risk as other firms. This is somewhat at odds with the perceived wisdom and anecdotal evidence that firms targeted by PE houses tend to be firms with stable cash flows even relative to other firms in their sectors.

To allow for this possibility, we ran the cross-sectional regression of equation (2) linking un-levered deal returns to un-levered sector returns, and estimating α and β of this relationship. The estimated coefficients are α = 12.2% (t-stat of 3.94) and β = 0.44 (t-stat of 2.62). This suggests that based on un-levered returns, the deals do appear to have less systematic risk than un-levered sector returns. Note also that the estimate of alpha is somewhat larger than that obtained in Table 2 under the assumption that β = 1. Table 14 also shows the corresponding attribution of IRR. On average, Sector contribution is now lower at 5% (compared to 11% in Table 2, Panel A), but importantly, incremental leverage on sector delivers little, since the quoted sector return of 5% after adjusting for beta is only just enough to finance the cost of debt (which we assumed to be 5% throughout). Thus, alpha of 12.2% and total leverage amplification on this alpha of 16.8%, contribute most of the average IRR of 35.6%. Thus, allowing (or recognizing) PE deals to be safer than the quoted sector results in attributing most of the returns generated by large, PE houses to out-performance relative to the quoted sector.

Since almost all our results (Table 3 onwards) are qualitatively robust to the new deal-level alphas thus estimated, we do not report these. Instead, we use the estimated beta of 0.44 to provide an understanding of the beta of "levered" deal returns. From equation (1), the levered beta of PE deals on un-levered sector return can be calculated as follows (where we have taken debt beta to be zero as an approximation):

$$\beta_{L,i} = \beta_{U,i} * (1 + D / E_i)$$

where we estimated $\beta_{U,i}$ to be 0.44 (assumed same for all *i*), and the average *D/E* for our deals is 1.3. Thus, we obtain that the levered beta of PE deals on un-levered sector return is 0.44 * 2.3, equal to 1.23. If we recognize that the sector leverage on average is 0.3 *D/E*, then we can also calculate the levered beta of PE deals on *levered* sector return as

$$\overline{\beta}_{L,i} = \beta_{L,i} / (1 + D / E_{S,i})$$

yielding that the levered beta of PE deals on levered sector return is around 0.945.

To summarize, PE deals appear much safer in their systematic risk compared to the quoted sectors at enterprise-level, as also shown by their performance during sector downturns (Table 7). However, taking account of their incremental leverage over that of quoted peers, PE deals appear roughly of the same systematic risk as (levered) quoted sectors. It is possible though that PE deals are special along some other dimensions. In ongoing work with Moritz Hahn, we employ a difference-of-difference approach to evaluate improvements in operating performance of PE deals before and after acquisition, relative to performance of public peers, where peers are matched to the PE deals based on propensity-score methodology applied to pre-acquisition accounting measures. Overall, we find that PE ownership has a significant effect on EBITDA margin and profitability, but not so for revenue growth, which is consistent with the findings of the current paper.

7. Concluding remarks and policy implications

The surge in private equity funding during 2003 through to the middle of 2007, and the aftermath of the sub-prime crisis since then, has brought research on private equity to confront similar issues as those after the boom and bust cycle of late 80s and early 90s. From an economic standpoint, the primary interest concerns the long-run viability and value creation, if any, from the private ownership of leveraged buyouts. On the policy front, the PE industry has attained a significant status in terms of number of employees working in PE-funded enterprises at some point and, as a result, has attracted a certain amount of media as well as regulatory scrutiny.[21] While some of this scrutiny is centred around whether tax rates on carry earned by PE houses is "fair", significant policy interest has also been expressed in understanding and quantifying the long-run impact of private equity in terms of value creation at enterprise level and in attribution of this value creation to financial engineering, systematic risk and operational engineering. Indeed, in some cases such as in the UK, policymakers have undertaken independent recommendations based on interactions with the PE industry to improve disclosure on such value attribution.[22]

Our paper is an attempt to get at some of these issues with three significant contributions. First, we have provided a simple methodology that relies only on returns and leverage information at the level of deal's equity, and the returns and leverage of quoted peer firms in order to extract a measure of out-performance of the deal ("alpha") at enterprise-level. The methodology also quantifies the sector and leverage contributions to deal return.

[21] See, for example, the House of Commons Treasury Committee's Tenth Report in the UK of Session 2006-07.
[22] Sir David Walker Report on "Disclosure and Transparency in Private Equity" (2007).

Second, we have shown using this measure that for 66 deals of twelve large, mature PE houses in the UK initiated during the period 1996-2004, there does seem to be evidence consistent with significant value creation for portfolio companies. Furthermore, deal-level alpha out-performance correlates well with operating out-performance of deals relative to quoted peers, especially to improvements in margins. As a parenthetic note, we also documented that the out-performance of large, mature PE houses is stronger during sector downturns and their deals grow employment on average, somewhat more slowly than quoted peers, but at enhanced productivity levels. Third, we provided evidence based on interviews with GPs involved in PE deals that implied that the out-performance of these PE houses is at least partly due to active ownership and governance they engage in. Overall, our results are consistent with PE deals generating *productive growth*.

Much remains to be done. In terms of this study itself, we are expanding the UK data to cover up to 80 deals and also collecting similar-sized samples for Continental Europe, to facilitate a comparative analysis of out-performance of PE deals. More broadly, however, the greatest interest remains in understanding in greater depth the nature of engagement and involvement of PE houses with portfolio companies and providing more robust evidence on how these relate to value creation. Larger, deal-level datasets prepared with the help of the PE industry are clearly required for this interest to be fulfilled by researchers. Finally, alternative and creative ways of understanding short-run and long-run investment impacts of the PE industry relative to other firms in the economy remains an important area to explore. The patent-based innovation analysis of PE companies undertaken by Lerner, Sorensen and Stromberg (2008) seems an exciting start on this front and suggests that PE deals generate not just productive growth but also *innovative growth.*

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Appendix I: Construction of active governance scores

To assess the impact of PE governance on outperformance, we assigned scores to 7 interview questions and related these with alpha

Action taken	Score
1 Management changes	
• Replacing CEO, CFO or Others in 1st 100 days	1
• All other outcomes	0
2 Value creation initiatives	
• Launch of one or more initiatives in each category (organic growth; productivity; strategic repositioning) during 1st 100 days	1
• All other outcomes	0
3 Value creation plan	
• Doing the following, in 1st 100 days	
– Make adjustments to plan	1
– Devising new KPIs	1
• Acting immediately on deviations at any time	1
• All other outcomes	0
4 Management support	
• Interacting > than once/week with CEO or CFO during 1st 100 days	1
• Committing > average GP time during 1st 100 days	1
• All other outcomes	0

Action taken	Score
5 Incentives	
• Awarding > average equity to management and employees	1
• Awarding equity to at least CEO, 1st line and 2nd line management	1
• Providing > average cash multiples on hitting base case targets in plan	1
• All other outcomes	0
6 Board structure	
• No. of people on board < average	1
• Share of NXDs on board < average	1
• CEO & chairman different	1
• All other outcomes	0
7 External support	
• Employing external consultants during each of the following:	
– DD phase	1
– 1st 100 days	1
– Year 1 or later	1
• All other outcomes	0

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Appendix II: Types of value-creation initiatives

Value creation initiatives consist of productivity and organic growth

Productivity initiatives
1 Purchasing (e.g. supplier consolidation)
2 Process efficiency (e.g. supply chain)
3 Overhead reduction (e.g. SG&A, or Selling, General & Admin costs)
4 Other cost reduction (detailed by interviewee)
5 Working capital reduction
6 CAPEX reduction

Organic growth initiatives
1 Review of pricing
2 New channels
3 New products
4 New geographies
5 Existing geographies, new customers
6 Existing geographies, existing customers

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Figure 1. Schematic of the methodology to extract alpha out-performance

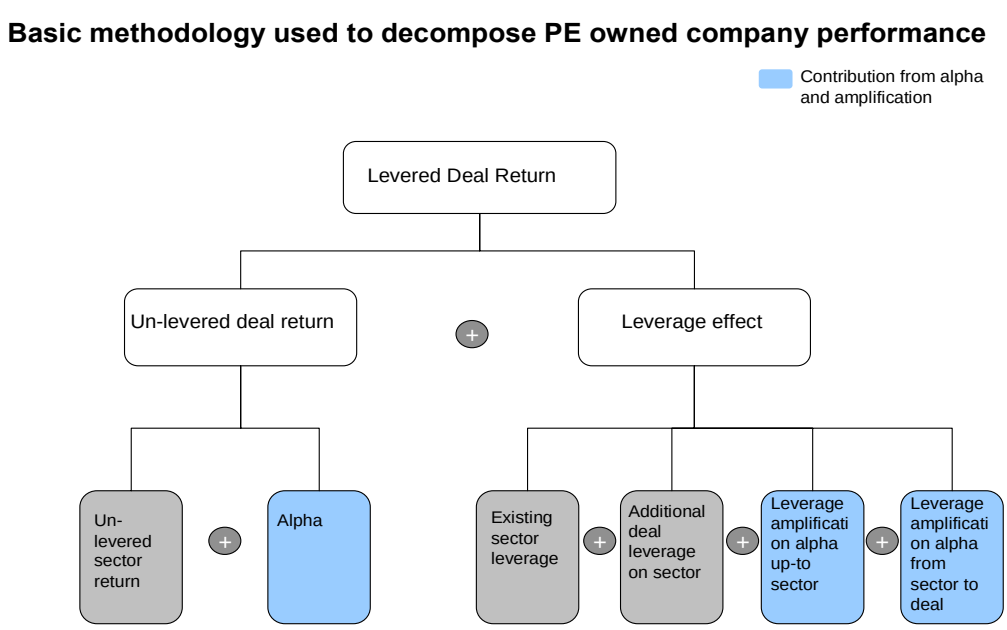
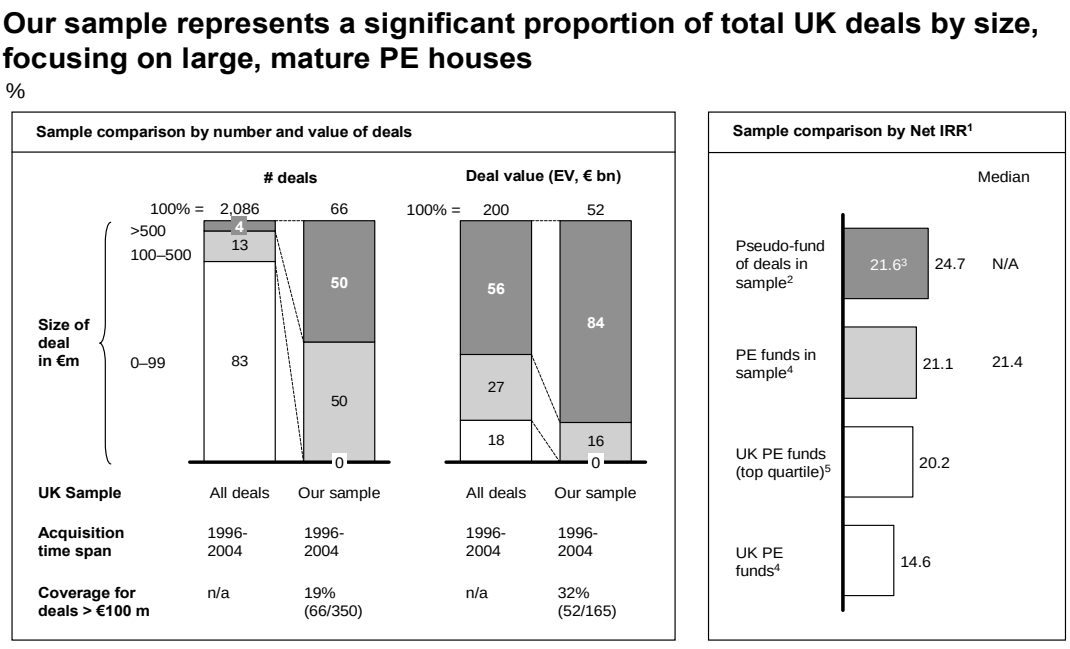


Figure 2. Benchmarking of the sample



1 Net IRR estimated with 1.5% annual fees, and 20% carry if IRR > assumed benchmark of 8% market return
2 Acquisitions from 1996 – 2004 (exits from 2000 – 07); pooled, net IRR calculated using quarterly cash flows
3 Excluding top four deals in terms of pooled IRR
4 Vintage years 1994 – 2004 (22 funds); 1989 (1 fund); simple average
5 Performance from Dec 2005 for vintage years 1996 – 2001; simple averages

Source: Capital IQ; Initiative Europe; Buyouts magazine; BVCA Private Equity and Venture Capital Performance Measurement Survey 2005; CalSTRS; CalPERS; VentureXpert; Press searches; team analysis

1

Figure 3: Pseudo-fund comprising the sample deals

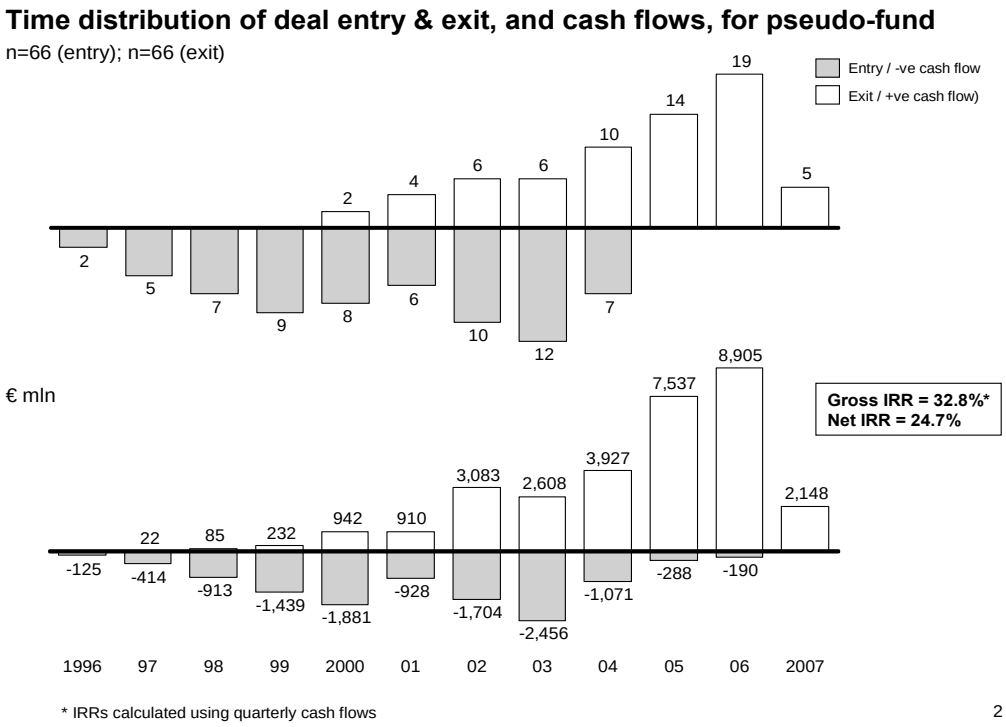


Figure 4. Timeline of active governance in a typical private equity transaction

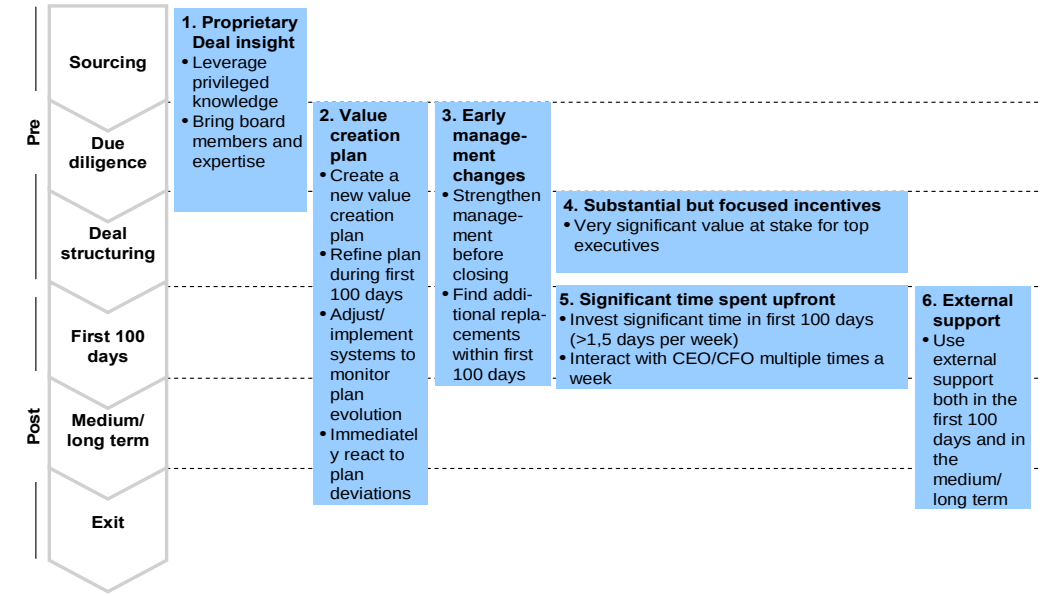


Figure 5. PE and PLC governance models

How does the PE governance model differ from that of PLCs?

Based on data from Spencer Stuart 2005 Board Index for top 150 firms in the UK (matched to average size of sample deals)

		PE Model	PLC Model*
1.	Board size	• Average size = 8	• Average Size = 10
2.	Board composition (%)	• NXD = 24 • PE = 33 • Mgt. = 43	• NXD = 50 • PE = 0 (n/a) • Mgt. = 50
3.	Frequency of board meetings	• Formal – 9/year on average • Informal – c. 90% of deals involve contact between GP and CEO at least once/week throughout deal life (with many deals involving frequent contact every week)	• Formal – 9/year
4.	Time commitment to firm	• PE partners – 0.4 Partner FTEs in 1st 100 days	• 20 hours/month equating to 0.1 FTE (based on 240 working days/year and 10 hours/working day)
5.	Ownership of firm	• PE owns 75% of total deal equity (inc. equity owned by other club members) and 'votes 100% of the shares'	• NXDs have little equity and own less than 2% of voting rights • Salary of £40-60k
6.	Management investment in deal	• Management co-invests and owns ~15 % of ordinary equity • CEO co-invests and owns ~6%	• CEO does not co-invest; works on salary and stock options
7.	Change in senior management	• CEO changed in 69% of deals (and within 1st 100 days in 39% deals)	• Average CEO service = 4.7 years
8.	Cost focus	• Successful deals grow margins as well as sales by cutting costs and increasing efficiency	• Only 36% of boards rate themselves as good at cost reduction

*Source: Korn Ferry 33rd Annual Board of Directors Study; team analysis

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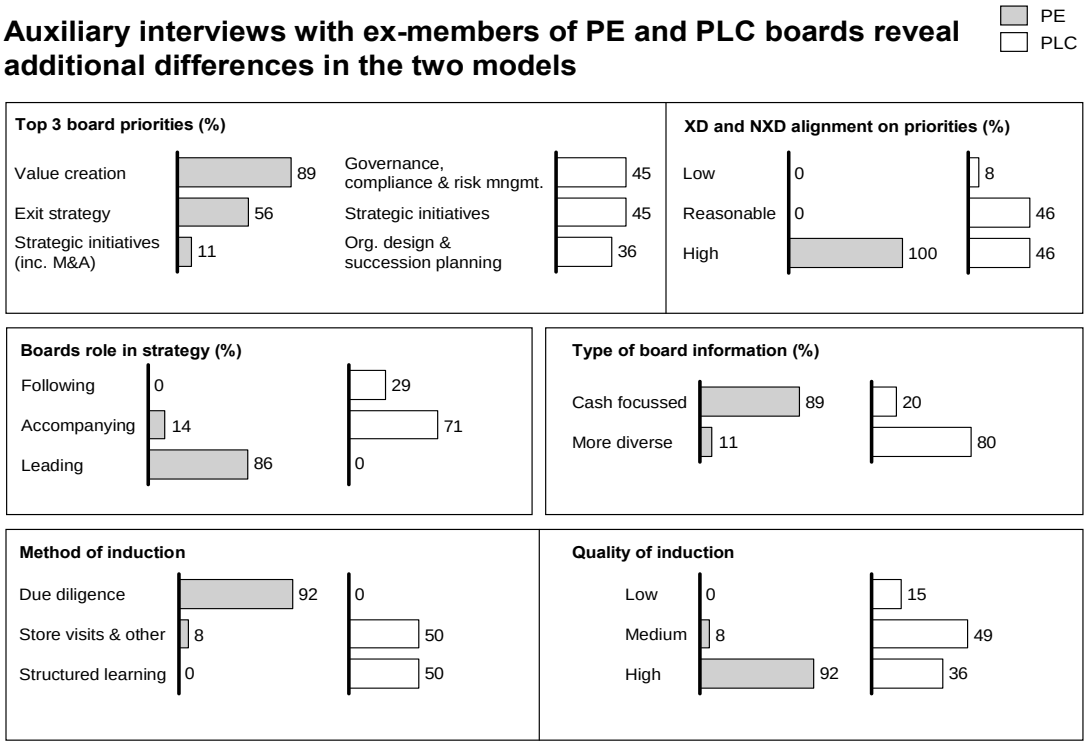
Figure 6. Modus operandi of PE and PLC boards

Auxiliary interviews with ex-members of PE and PLC boards reveal additional differences in the two models



Source: MWM Consulting; McKinsey analysis

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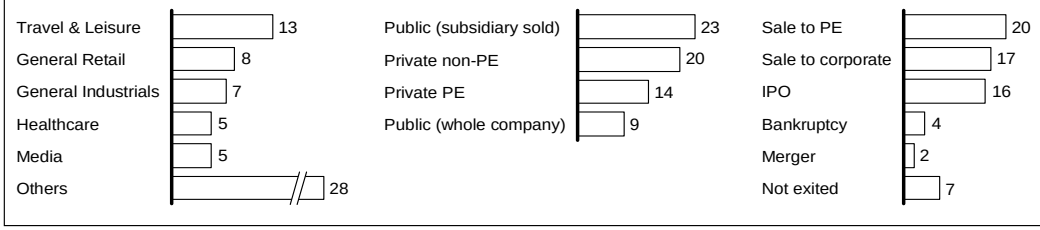
Table 1 – Panel A

Distribution of deals by sector, deal source, exit type and years

Deals split by…



Deals by entry and exit year (n = 66)

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Entry	2	5	7	9	8	6	10	12	7	n/a	n/a	n/a
Exit	n/a	n/a	n/a	n/a	2	4	6	6	10	14	19*	5**

* Includes five deals for which exit simulated
** Includes two deals for which exit simulated

3

Table 1 – Panel B

UK data summary statistics

	No. deals (n)	Mean	Median	StdDev	Minimum	Maximum
Deal IRR %	66	35.6	31.0	45.0	-72.5	197.4
Duration* (years)	59	3.8	3.5	1.5	1.2	7.3
Cash In/cash out multiple	66	2.8	2.4	1.9	0	10.3
Deal size** (Mio, EUR)	66	795	471	767	110	3157
EBITDA multiple (Entry)	63	9.6	9.1	4.6	3.2	34.8
EBITDA multiple (Exit)	61	10.5	9.9	4.5	3.4	23.6
Debt/equity (Entry)	65	1.7	1.6	0.8	0.1	5.2
Debt/equity (Exit)	65	0.9	0.6	0.9	0	5.1
Debt/EBITDA (Entry)	62	5.7	5.3	3.6	0	29.1
Debt/EBITDA (Exit)	60	4.5	4.0	2.8	0	15.1

*Only exited deals
** All data converted to Euros to enable direct comparison
Source: PE deal data; team analysis

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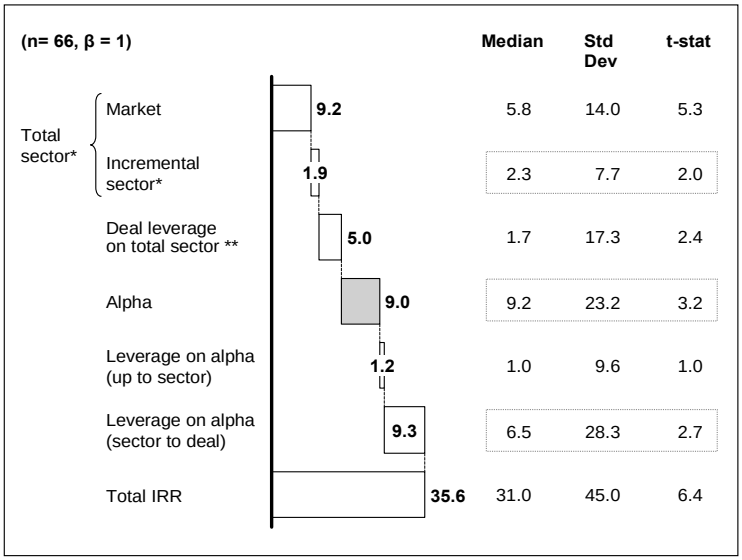
Table 2 – Panel A

PE deals of our sample have out-performed their sectors on average, after adjusting for leverage

IRR decomposition (%)



* Sector return reflects the market return and the additional return (over the market) by the comparable sectors over the deal period

** Deal leverage effect assumes sector leverage is increased to the deal leverage

Source: PE deal data; Datastream; team analysis

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Table 2 – Panel B

Performance of club vs. non club deals, and by size at acquisition

Deal type	# of deals	IRR %	Alpha %
Club Deals	25	40.4	14.3
Non club deals	41	32.7	5.7
Total	66	35.6	9.0

Deal size (EV at acquisition)	# of deals	IRR %	Alpha %
>1 billion Euro	18	42.7	8.4
500m -1billion Euro	15	48.4	11.1
100m- 500m Euro	33	26.0	8.3
Total	66	35.6	9.0

Source: PE deal data; Datastream; team analysis

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Table 2 – Panel C

Performance by deal source and exit type

Deal source	# of deals	IRR (%)	Alpha (%)
Private non-PE	20	38.9	5.8
Private PE	14	36.7	10.3
Public carve-out (subsidiary sold)	23	33.8	14.5
Public to private	9	31.3	0.0
Total	66	35.6	9.0

Exit type	# of deals	IRR (%)	Alpha (%)
Sale to corporate	17	50.1	17.2
IPO	16	49.5	12.4
Merger	2	37.5	-0.4
Sale to PE	20	31.9	9.1
Not exited (exit simulated)	7	29.1	6.3
Bankruptcy	4	-52.8	-30.7
Total	66	35.6	9.0

Source: PE deal data; Datastream; team analysis

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Table 2 – Panel D

Matching of IRR Quartiles and Alpha Quartiles by number of deals

(n = 66)

IRR Quartile → / Alpha Quartile ↓	Q1	Q2	Q3	Q4
Q1	10	6	1	0
Q2	3	6	6	1
Q3	1	3	6	6
Q4	3	1	3	10
Total	17	16	16	17

Source: PE deal data; analysis

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Table 3

Operating performance of all deals

%

	No. deals*	Mean	Median	St. deviation	Minimum	Maximum
Sales CAGR	62	10.0	8.2	14.8	-25.0	63.0
w/o deals with M/A	34	11.1	7.4	15.4	-15.2	63.0
EBITDA CAGR	61	10.2	8.5	17.7	-34.8	66.1
w/o deals with M/A	34	12.1	9.0	17.0	-24.8	66.1
Margin growth, p.a.	61	0.3	0.1	2.2	-7.3	7.9
w/o deals with M/A	34	0.7	0.1	2.5	-4.7	7.9
FTE CAGR	44	1.6	1.2	12.7	-30.3	30.9
w/o deals with M/A	24	1.0	1.1	11.4	-22.5	30.9
EBITDA/FTE CAGR	44	11.6	8.5	18.8	-21.6	88.2
w/o deals with M/A	24	16.1	12.0	19.7	-3.2	88.2
CAPEX CAGR	31	14.4	10.1	40.0	-54.3	154.8
CAPEX/Sales CAGR	31	1.2	0.5	34.5	-59.0	116.4
SGA CAGR	24	9.6	13.0	18.6	-49.8	38.2
SGA/Sales CAGR	21	-3.9	-3.5	11.7	-33.8	27.6
Fixed Assets CAGR	20	3.2	2.1	10.7	-17.9	23.0
Fixed Assets/Sales CAGR	20	-7.8	-7.7	12.7	-40.5	16.2

* Excluding deals with negative EBITDA figures for entry or exit years
Source: PE deal data; team analysis

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Table 4 – Panel A

High alpha deals have higher EBITDA and margin growth, and also benefit from an increase in EV/EBITDA multiples relative to their sector peers

%

(n= 66)

Alpha quartile	Deal Sales CAGR	Sector Sales CAGR	Deal EBITDA CAGR	Sector EBITDA CAGR	Deal EBITDA margin change p.a.	Sector EBITDA margin change p.a.	Deal EV/ EBITDA (start)	Deal EV/ EBITDA (exit)	Sector EV/ EBITDA (start)	Sector EV/ EBITDA (exit)
Q1	13.1	10.3	21.7	14.8	1.4	0.0	8.4	10.4	11.3	9.4
Q2	11.7	4.6	11.5	5.1	0.9	0.1	8.7	11.3	8.8	9.4
Q3	8.7	3.8	4.3	5.9	-0.5	-0.2	10.9	10.0	9.6	9.6
Q4	6.3	4.3	3.3	7.1	-0.5	0.4	10.3	10.4	7.4	8.1
Average	10.0	5.7	10.2	8.2	0.3	0.1	9.6	10.5	9.3	9.1
Median	8.2	3.2	8.5	4.8	0.1	0.0	9.1	9.9	8.1	9.1
t-stat	*5.3*	*3.8*	*4.5*	*5.2*	*1.1*	*0.4*	*16.7*	*18.1*	*21.2*	*28.7*
t-stat of diff with sector	*1.7*		*0.8*		*0.6*		*0.4*	*2.5*		

Source: PE deal data; Datastream; team analysis

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Table 4 – Panel B

High alpha deals have higher EBITDA and margin growth, and also benefit from an increase in EV/EBITDA multiples relative to their sector peers

%

(n= 62)

Alpha quartile	Deal Sales CAGR	Sector Sales CAGR	Deal EBITDA CAGR	Sector EBITDA CAGR	Deal EBITDA margin change p.a.	Sector EBITDA margin change p.a.	Deal EV/ EBITDA (start)	Deal EV/ EBITDA (exit)	Sector EV/ EBITDA (start)	Sector EV/ EBITDA (exit)
Q1	18.7	7.9	20.4	11.8	0.9	0.4	9.1	10.5	10.5	9.4
Q2	10.1	2.6	9.7	4.2	0.7	0.0	8.6	11.7	8.5	9.2
Q3	7.7	4.2	4.0	6.1	-0.5	-0.2	11.1	9.8	9.6	9.5
Q4	5.9	4.2	2.7	7.1	-0.6	0.4	10.2	10.2	7.6	8.3
Average	10.5	4.7	9.1	7.3	0.1	0.2	9.8	10.5	9.0	9.1
Median	9.5	3.8	7.6	4.8	0.0	0.0	9.2	10.0	8.0	9.1
t-stat	*5.3*	*5.5*	*4.2*	*5.1*	*0.5*	*1.1*	*16.4*	*17.4*	*21.3*	*26.9*
t-stat of diff with sector	*2.9*		*0.8*		*-0.1*		*1.0*	*2.5*		

Source: PE deal data; Datastream; team analysis

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Table 5 - Panel A

Deals with high alpha grow employment faster than the sector; on average PE employment growth is positive, but below sector

Quartiles sorted by alpha

(n= 66)	All deals					Deals excluding acquisitions and divestments			
Alpha quartile	**Deal Employ-ment CAGR%**	**Sector Employ-ment CAGR%**	**EBITDA/ FTE CAGR%**	**Sector EBITDA/ FTE CAGR%**		**Deal Employ-ment CAGR%**	**Sector Employ-ment CAGR%**	**EBITDA / FTE CAGR%**	**Sector EBITDA / FTE CAGR%**
Q1	8.2	2.8	19.3	7.9		1.6	2.0	26.5	7.6
Q2	2.1	3.6	11.2	2.4		3.2	5.6	14.7	3.2
Q3	-2.1	0.7	10.4	2.0		1.6	2.5	3.8	2.3
Q4	-1.7	3.0	6.4	12.1		-8.4	3.0	20.7	22.6
Average	1.6	2.7	11.6	5.6		1.0	3.7	16.1	6.5
Median	1.2	1.8	8.5	2.9		1.1	2.3	12.0	2.9
t-stat	*0.9*	*3.1*	*4.1*	*2.9*		*0.4*	*3.1*	*4.0*	*2.1*
t-stat of diff with sector	*-0.5*		*1.7*			*-1.0*		*2.0*	

Source: PE deal data; Datastream; team analysis

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Table 5 - Panel B

Deals with high alpha grow employment faster than the sector; on average PE employment growth is positive, but below sector

Quartiles sorted by alpha

(n= 62)	All deals					Deals excluding acquisitions and divestments			
Alpha quartile	**Deal Employ-ment CAGR%**	**Sector Employ-ment CAGR%**	**EBITDA/ FTE CAGR%**	**Sector EBITDA/ FTE CAGR%**		**Deal Employ-ment CAGR%**	**Sector Employ-ment CAGR%**	**EBITDA / FTE CAGR%**	**Sector EBITDA / FTE CAGR%**
Q1	14.0	6.1	9.9	4.7		10.3	7.0	12.4	2.8
Q2	0.5	2.4	10.8	1.7		0.7	3.9	15.0	2.2
Q3	-3.2	0.7	10.7	1.9		0.2	2.9	2.7	2.0
Q4	-1.7	3.0	6.4	12.1		-8.4	3.0	20.7	22.6
Average	2.2	3.0	9.5	4.9		2.1	4.5	12.7	5.3
Median	1.7	2.1	8.2	2.8		1.5	2.8	10.6	2.8
t-stat	*1.1*	*3.3*	*4.1*	*2.7*		*0.8*	*3.5*	*4.5*	*1.8*
t-stat of diff with sector	*-0.4*		*1.6*			*-0.8*		*2.2*	

Source: PE deal data; Datastream; team analysis

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Table 6 – Panel A

Relative margin growth is the most significant determinant of alpha

Regression no.	Alpha regressed on	Inter-cept	Deal duration	Size (*10^{-5})	Acquisition dummy	Divest-ment dummy	Sales CAGR relative to sector	EBITDA CAGR relative to sector	EBITDA Margin CAGR relative to sector	R^2 (Obs)
1	Coeff	0.27	-0.047	0.60	-0.027	-0.082	-0.062			21%
	t-stat	(3.51)	(-2.63)	(0.19)	(-0.45)	(-1.18)	(-0.47)			(61)
2	Coeff	0.26	-0.044	-0.14	-0.035	-0.058		0.179		23%
	t-stat	(3.39)	(-2.50)	(-0.04)	(-0.61)	(-0.84)		(1.44)		(61)
3	Coeff	0.27	-0.046	-0.01	-0.008	-0.063			**0.36**	29%
	t-stat	(3.62)	(-2.71)	(-0.02)	(-0.14)	(-0.96)			**(2.50)**	(61)
							Multiple expansion			
4	Coeff	0.21	-0.027	-1.42	-0.062	-0.045	0.012		**0.37**	31%
	t-stat	(2.77)	(-1.52)	(-0.47)	(-1.10)	(-0.68)	(2.46)		**(2.39)**	(57)
							Buy-well	Sell-well		
5	Coeff	0.13	-0.009	-0.36	-0.068	-0.047	0.027	0.017	**0.53**	48%
	t-stat	(1.92)	(-0.57)	(-0.14)	(-1.39)	(-0.83)	(4.89)	(2.83)	**(3.89)**	(55)

Source: PE deal data; Datastream; team analysis

Table 6 – Panel B

IRR is also linked to absolute EBITDA, absolute and relative margin growth

Regression no.	IRR regressed on	Inter-cept	Deal duration	Size (*10^{-5})	Acquisition dummy	Divest-ment dummy	Absolute EBITDA CAGR	Absolute EBITDA Margin CAGR	EBITDA Margin CAGR relative to sector	R^2 (Obs)
1	Coeff	0.73	-0.13	1.24	-0.065	-0.011	1.09			46%
	t-stat	(4.48)	(-3.55)	(0.21)	(-0.57)	(-0.08)	(3.54)			(61)
2	Coeff	0.82	-0.12	-0.12	0.027	-0.097		1.81		55%
	t-stat	(5.83)	(-3.88)	(-0.02)	(0.26)	(-0.79)		(5.00)		(61)
3	Coeff	0.94	-0.15	0.091	0.075	-0.141			**0.97**	45%
	t-stat	(6.19)	(-4.34)	(0.02)	(0.66)	(-1.05)			**(3.26)**	(61)
							Multiple expansion			
4	Coeff	0.82	-0.13	2.34	0.034	-0.132	0.021		**0.79**	44%
	t-stat	(5.12)	(-3.42)	(0.36)	(0.28)	(-0.93)	(2.07)		**(2.43)**	(57)
							Buy-well	Sell-well		
5	Coeff	0.68	-0.097	3.98	0.029	-0.129	0.050	0.030	**1.11**	53%
	t-stat	(4.43)	(-2.72)	(0.66)	(0.26)	(-0.99)	(3.95)	(2.14)	**(3.57)**	(55)

Source: PE deal data; Datastream; team analysis

Table 6 – Panel C

Relative margin growth is a significant determinant of alpha and IRR, even after excluding outliers

Regression no.	Alpha regressed on	Intercept	Deal duration	Size ($*10^{-5}$)	Acquisition dummy	Divestment dummy	Multiple expansion		EBITDA Margin CAGR relative to sector	R^2 (Obs)
1	Coeff	0.11	-0.005	-0.51	-0.060	-0.051	0.022		**0.44**	33%
	t-stat	(1.38)	(-0.29)	(-0.18)	(-1.17)	(-0.85)	(3.81)		**(2.37)**	(52)
							Buy-well	Sell-well		
2	Coeff	0.12	-0.007	-0.17	-0.064	-0.046	0.026	0.017	**0.47**	37%
	t-stat	(1.57)	(-0.41)	(-0.06)	(-1.26)	(-0.77)	(4.17)	(2.64)	**(2.57)**	(52)

Regression no.	IRR regressed on	Intercept	Deal duration	Size ($*10^{-5}$)	Acquisition dummy	Divestment dummy	Multiple expansion		EBITDA Margin CAGR relative to sector	R^2 (Obs)
1	Coeff	0.54	-0.076	4.33	0.070	-0.121	0.031		**0.69**	39%
	t-stat	(3.72)	(-2.30)	(0.76)	(0.69)	(-1.02)	(2.72)		**(1.86)**	(52)
							Buy-well	Sell-well		
2	Coeff	0.56	-0.078	4.73	0.066	-0.116	0.036	0.025	**0.72**	40%
	t-stat	(3.80)	(-2.36)	(0.83)	(0.64)	(-0.97)	(2.84)	(1.94)	**(1.95)**	(52)

Source: PE deal data; Datastream; team analysis

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Table 6 – Panel D

Relative margin growth is a significant determinant of alpha, even after controlling for entry and exit year

Regression no.	Alpha regressed on	Deal duration	Size ($*10^{-5}$)	Acquisition dummy	Divestment dummy	Buy-well	Sell-well	EBITDA Margin CAGR relative to sector	R^2 (Obs)
1	Coeff	-0.025	-0.005	-0.039	-0.058	0.026	0.017	**0.43**	61%
	t-stat	(-1.09)	(-0.02)	(-0.75)	(-0.97)	(4.59)	(2.81)	**(2.86)**	(55)
	Entry yr			1996-98	1999-00	2001-02	2003-04		
	Coeff			0.17	0.20	0.21	0.10		
	t-stat			(1.70)	(2.07)	(2.73)	(1.40)		
2	Coeff	-0.009	-0.47	-0.064	-0.047	0.029	0.018	**0.55**	58%
	t-stat	(-0.56)	(-0.17)	(-1.28)	(-0.80)	(4.88)	(2.80)	**(3.55)**	(55)
	Exit yr				2000	2001-02	2003-07		
	Coeff				0.044	0.14	0.13		
	t-stat				(0.36)	(1.73)	(1.79)		

Source: PE deal data; Datastream; team analysis

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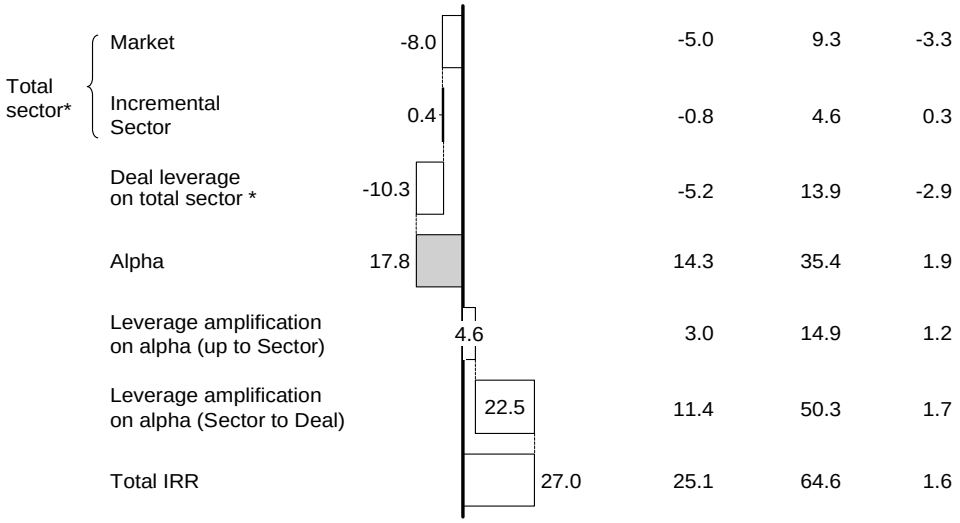
Table 7 – Panel A

Deal alpha is not adversely affected during sector downturns (it is actually twice as high as the overall average)

Deals with negative total sector TRS over deal life (n = 15)



* Sector return reflects the market return and the additional return (over the market) by the comparable sectors over the deal period

** Deal leverage effect assumes sector leverage is increased to the deal leverage

Source: PE deal data; Datastream; team analysis

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Table 7 – Panel B

Operating performance when quoted peers have negative returns

%

	No. deals*	Mean	Median	St. deviation	Minimum	Maximum
Sales CAGR	14	7.6	10.8	12.4	-15.2	22.0
Sector	14	2.7	2.5	5.8	-6.1	16.0
EBITDA CAGR	14	9.8	7.5	20.5	-24.8	66.1
Sector	14	1.1	-0.9	7.3	-10.5	18.6
Margin growth, p.a.	14	0.4	0.1	2.2	-2.2	6.4
Sector	14	-0.3	-0.4	0.9	-2.3	2.0
FTE CAGR	10	-2.3	0.6	15.7	-30.3	23.9
Sector	10	0.9	0.3	4.4	-4.2	8.0
EBITDA/FTE CAGR	10	16.9	10.8	27.1	-7.6	88.2
Sector	10	-0.2	-0.9	6.2	-7.1	12.7
CAPEX CAGR	5	0.5	0.0	42.8	-54.3	63.3
CAPEX/Sales CAGR	5	-0.1	-5.1	48.7	-53.5	74.0
SGA CAGR	6	0.2	7.0	26.4	-49.8	25.2
SGA/Sales CAGR	4	-2.8	-4.1	4.4	-6.6	3.4
Fixed Assets CAGR	4	-8.3	-8.4	9.0	-17.9	1.6
Fixed Assets/Sales CAGR	4	-3.3	-6.6	13.8	-16.3	16.2

* Excluding deals with negative EBITDA figures for entry or exit years

Source: PE deal data; Datastream; team analysis

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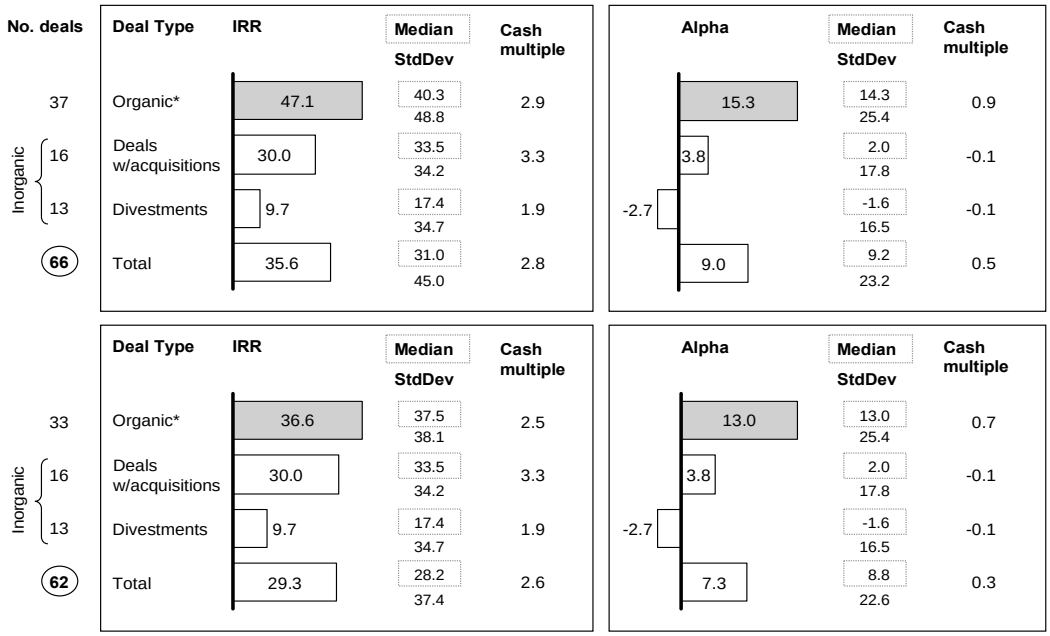
Table 8 – Panel A

Organic deals outperform inorganic deals on both total IRR and alpha; divestments appear to distinctly under-perform in our sample



* Organic deals are those where no major acquisition or divestment was reported

Source: PE deal data; Datastream; team analysis

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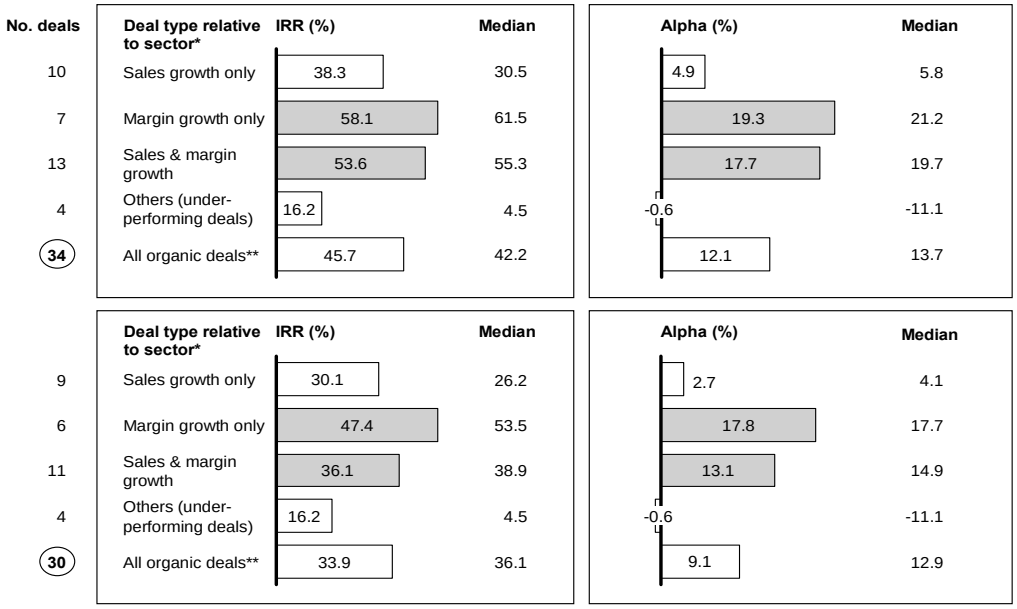
Table 8 – Panel B

In organic deals, margin improvement relative to sector has the highest impact on alpha



* Deal classification based on performance relative to sector e.g. for sales growth only, sales growth is higher than sector, but margin growth is not

** Organic deals used where relevant sector data available

Source: PE deal data; Datastream; team analysis

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Table 9 – Panel A

Success comes from substantial margin growth, or some margin growth coupled with substantial sales growth

Organic deals (n=34)	Deal performance (%)					Sector performance (%)				
Deal type relative to sector	**Sales CAGR**	**EBITDA CAGR**	**Change in EBITDA margin p.a.**	**EBITDA/ FTE CAGR**	**FTE CAGR**	**Sales CAGR**	**EBITDA CAGR**	**Change in EBITDA margin p.a.**	**EBITDA/ FTE CAGR**	**FTE CAGR**
Sales growth without margin improvement	19.4	12.7	-0.7	9.8	3.8	3.3	11.9	0.9	14.1	2.7
Margin improvement w/o rev. growth	-1.3	10.5	3.7	21.9	-3.9	18.3	16.8	-1.0	0.5	10.0
Margin improvement & rev. growth	15.4	20.0	0.9	21.4	4.8	5.1	2.9	-0.3	3.7	2.1
Others (under-performing deals)	-2.2	-11.7	-1.9	9.6	-13.8	4.0	2.1	-0.2	2.1	5.7
All organic deals	11.1	12.1	0.7	16.1	1.0	7.2	8.3	-0.1	6.5	3.7
Median	7.4	9.0	0.1	12.0	1.1	3.8	4.8	0.1	2.9	2.3
t-stat	*4.2*	*4.2*	*1.6*	*4.0*	*0.4*	*2.8*	*3.9*	*-0.3*	*2.1*	*3.1*

Source: PE deal data; Datastream; team analysis

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Table 9 – Panel B

Substantial margin improvement takes place in the very first year

Organic deals (n=34)	Deal performance (%)					PE owned deal performance (YR 1 %)				
Deal type relative to sector	**Sales CAGR**	**EBITDA CAGR**	**Change in EBITDA margin p.a.**	**EBITDA/ FTE CAGR**	**FTE CAGR**	**Sales**	**EBITDA**	**Change in EBITDA margin**	**EBITDA/ FTE**	**FTE**
Sales growth without margin improvement	19.4	12.7	-0.7	9.8	3.8	16.2	11.1	-2.6	1.3	-3.1
Margin improvement w/o rev. growth	-1.3	10.5	3.7	21.9	-3.9	0.7	11.9	10.8	81.3	28.4
Margin improvement & rev. growth	15.4	20.0	0.9	21.4	4.8	20.8	29.0	9.5	22.2	-0.5
Others (under-performing deals)	-2.2	-11.7	-1.9	9.6	-13.8	1.8	-21.9	-15.2	13.0	-14.2
All organic deals	11.1	12.1	0.7	16.1	1.0	13.0	14.3	3.5	18.5	-6.0
Median	7.4	9.0	0.1	12.0	1.1	8.4	9.1	2.5	13.5	-4.1
t-stat	*4.2*	*4.2*	*1.6*	*4.0*	*0.4*	*3.0*	*2.8*	*1.1*	*1.9*	*-1.5*

Source: PE deal data; Datastream; team analysis

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Table 9 – Panel C

EV/EBITDA improves substantially only for margin improvement deals

Organic deals (n=34), Inorganic deals (n = 27)

	Deal performance			Sector performance	
Organic deals by strategy	EV/ EBITDA (start)	EV/ EBITDA (exit)		EV/ EBITDA (start)	EV/ EBITDA (exit)
Sales growth without mgn. improvement	11.3	11.5		8.7	8.6
Margin improvement w/o rev. growth	9.6	11.6		10.3	9.4
Margin improvement & rev. growth	8.5	9.2		8.9	8.9
Others	8.3	8.2		7.7	8.8
Average of all organic deals	9.5	10.2		9.0	8.9
Average of inorganic deals	9.6	10.9		9.8	9.5

Source: PE deal data; Datastream; team analysis

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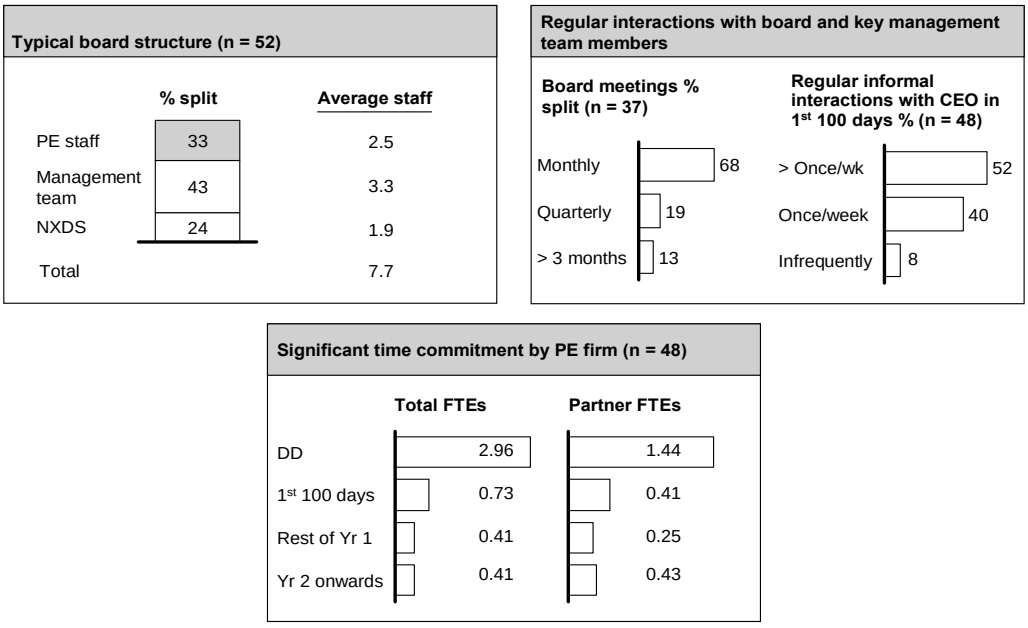
Table 10 – Panel A

PE follows an active governance approach



Source: PE deal data; Datastream; team analysis

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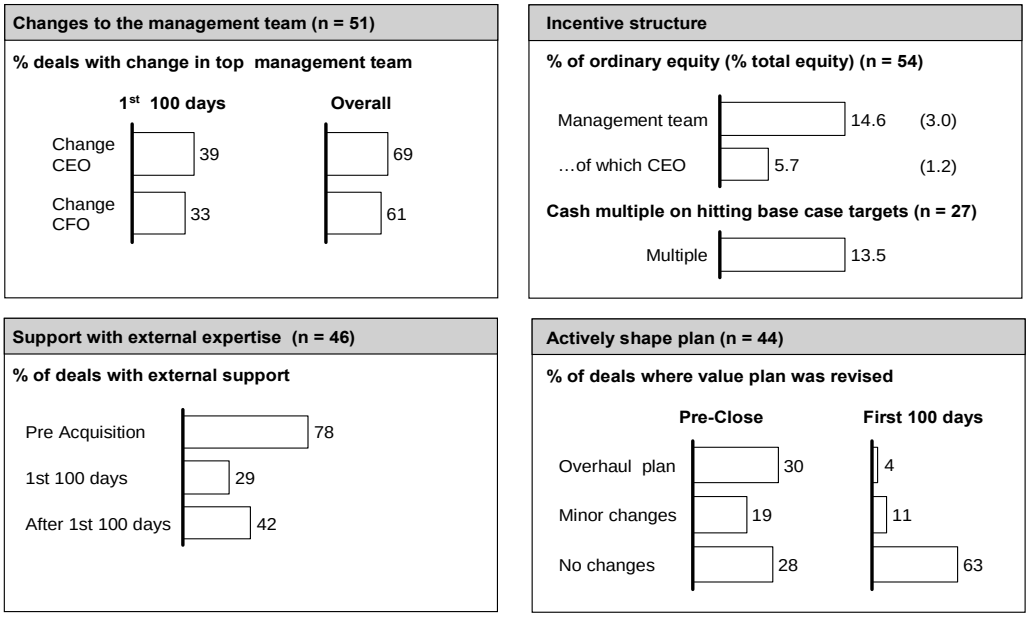
Table 10 – Panel B

PE follows an active governance approach (continued)



Source: PE interviews; team analysis

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Table 11 – Panel A

Comparison of interview-based governance scores by quartile

All scores normalised

Alpha quartile	Changed mngmt. in 1st 100 days	Launched value creation initiatives	Shaped value creation plan	Provided mngmt. support	Provided strong incentives	Created an effective board	Leveraged external support	Total score across 7 questions
Q1	0.49	0.59	0.68	0.75	0.39	0.64	0.69	0.58
Q2	0.36	0.54	0.52	0.55	0.45	0.64	0.47	0.48
Q3	0.31	0.57	0.71	0.51	0.59	0.75	0.47	0.60
Q4	0.36	0.48	0.58	0.56	0.54	0.62	0.33	0.50
Average	0.38	0.54	0.62	0.59	0.50	0.66	0.49	0.54

Source: PE interviews; team analysis

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Table 11 – Panel B

Management change in first 100 days and leveraging external support correlate with alpha the best

Individual regressions (intercept, size, duration, acquisition dummy, divestment dummy – not reported)

Alpha regressed on (controlling for duration and size)	Changed mgt. in 1st 100 days	Launched multiples initiatives for value creation	Shaped value creation plan	Provided management support	Provided strong incentives	Created an effective board	Leveraged external support
Coefficient	**0.10**	0.011	0.106	0.091	-0.095	-0.019	**0.24**
t-stat	**1.68**	0.22	1.03	1.02	-1.35	-0.28	**2.81**
R^2	**27%**	27.2%	21%	25%	22%	21%	**38%**
Obs	**48**	38	46	47	54	61	**43**

Joint regression

Alpha regressed on (controlling for duration and size)	Intercept	Deal duration	Size ($*10^{-5}$)	Acquisition dummy	Divest-ment dummy	Changed mgt. in 1st 100 days	Leveraged external support
Coefficient	0.12	-0.049	-2.012	-0.034	-0.058	**0.11**	**0.22**
t-stat	0.94	-2.08	-0.43	-0.51	-0.82	**1.69**	**2.50**
R^2	**43%**						
Obs	**42**						

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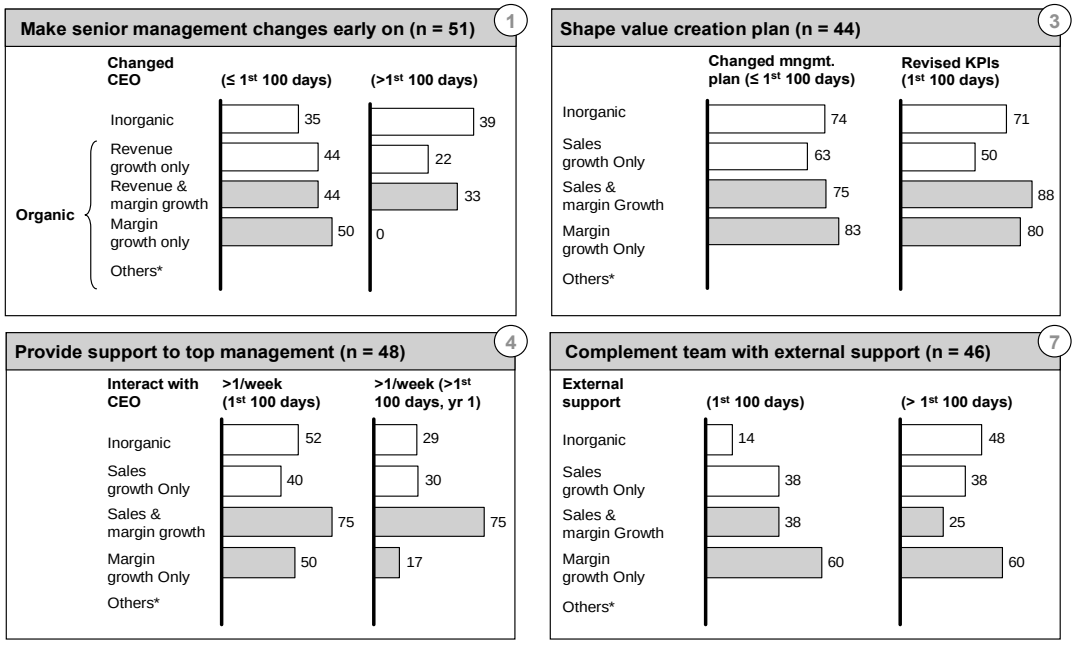
Table 12 – Panel A

Deals with substantial margin growth, or those with substantial sales growth and some margin growth, have the highest deal involvement



* Too few data points to provide reliable % figures

Source: PE interviews; team analysis

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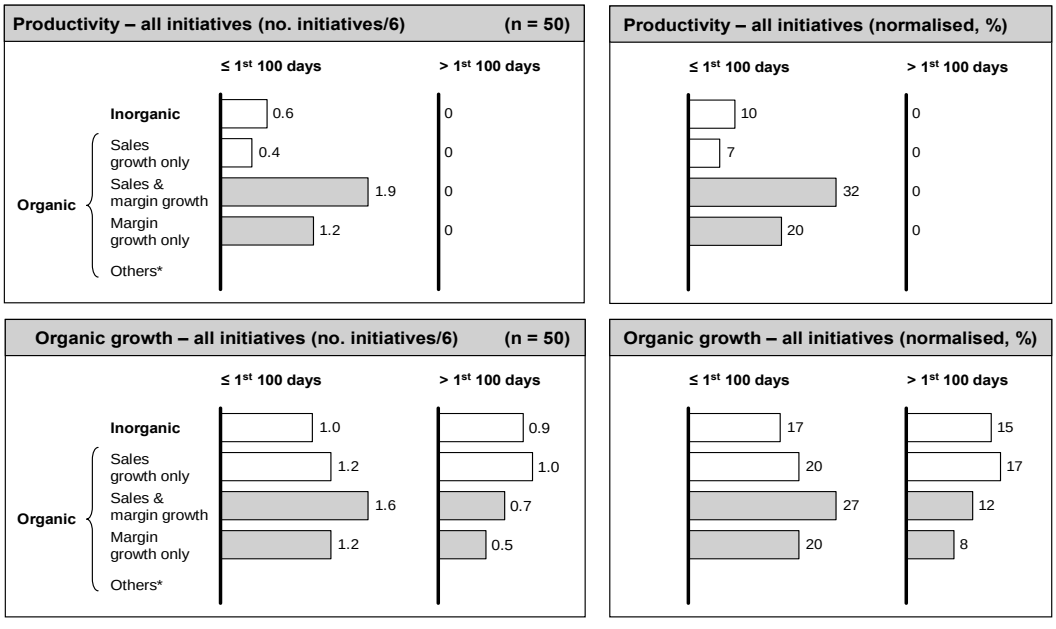
Table 12 – Panel B

Margin deals involve far more productivity – but a similar number of growth – initiatives compared to other deals, implying 'productive growth'



* Too few data points to provide reliable % figures

Source: PE interviews; team analysis

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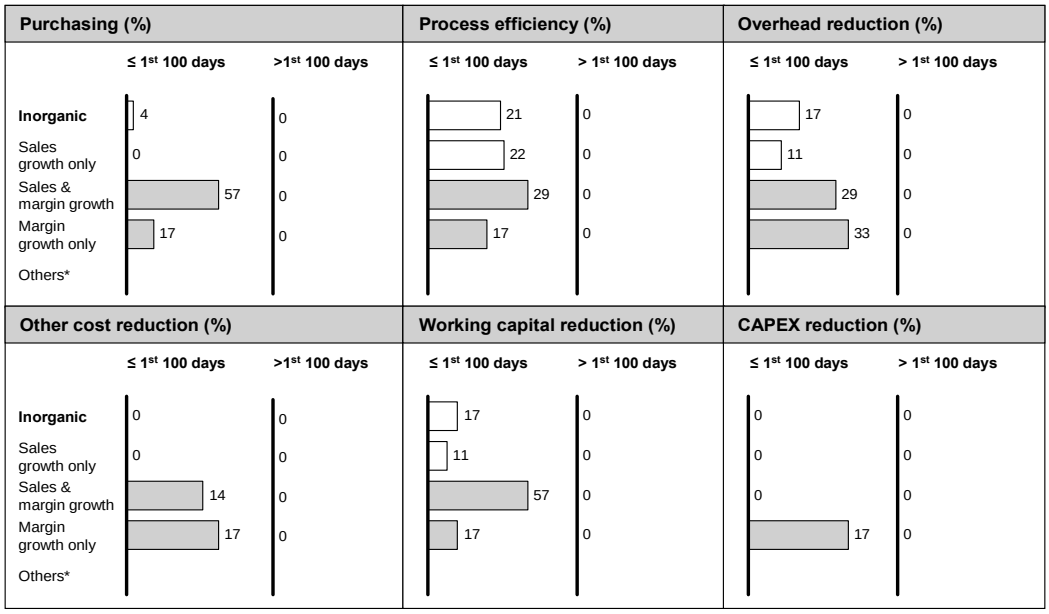
Table 12 – Panel C

Productivity initiatives

n = 50



* Too few data points to provide reliable % figures

Source: PE interviews; team analysis

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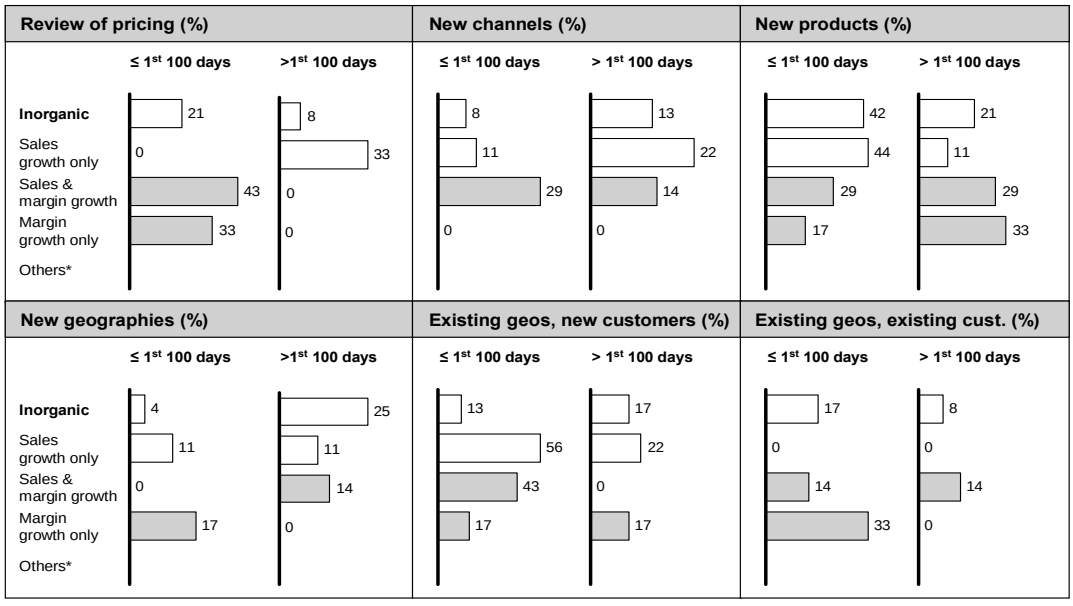
Table 12 – Panel D

Organic growth initiatives

n = 50



* Too few data points to provide reliable % figures

Source: PE interviews; team analysis

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Table 13 – Panel A

Relationship between acquisition deal leverage (D/EV) and alpha is non-monotone, although deals with lowest leverage have the highest alpha

Quartiles sorted by leverage at acquisition

	Leverage	IRR decomposition (%)					No. bad deals	
Leverage quartile	Entry D/EV	Sector	Deal leverage on sector	Alpha	Leverage on alpha	Total IRR	Dogs* (IRR < 0)	Bankruptcies
Q1	0.72	9.0	5.2	7.2	11.8	33.2	2	0
Q2	0.64	17.5	10.1	6.4	15.3	49.3	1	1
Q3	0.57	7.7	1.8	5.1	7.6	22.2	3	1
Q4	0.39	10.4	3.4	16.8	7.1	37.7	3	2
Average	0.58	11.1	5.0	9.0	10.5	35.6	9	4

Alpha quartile	Entry D/EV	Exit D/EV	Average D/EV
Q1	0.48	0.38	0.43
Q2	0.62	0.34	0.48
Q3	0.63	0.45	0.54
Q4	0.58	0.61	0.59
Average	0.58	0.45	0.51

Deal strategy relative to sector	Entry D/EV	Exit D/EV	Average D/EV
Inorganic	0.61	0.47	0.54
Organic	0.59	0.46	0.52
Sales growth only	0.61	0.45	0.53
Margin growth only	0.60	0.44	0.52
Sales & margin growth	0.60	0.49	0.55
Others	0.44	0.43	0.43

* Includes bankrupt deals

Source: PE deal data; Datastream; team analysis

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Table 13 – Panel B

Operating performance by leverage quartile

	Deal performance						**Sector performance**				
Leverage quartile	Sales CAGR %	EBITDA CAGR %	Change in EBITDA margin % p.a.	EV/ EBITDA (entry)	EV/ EBITDA (exit)		Sales CAGR %	EBITDA CAGR %	Change in EBITDA margin % p.a.	EV/ EBITDA (entry)	EV/ EBITDA (exit)
Q1	9.4	6.9	-0.1	10.1	10.8		3.1	6.0	0.1	9.1	9.5
Q2	8.7	15.1	0.9	8.7	11.1		2.4	3.5	0.1	8.3	9.2
Q3	8.3	5.8	0.5	10.0	10.3		8.7	9.6	-0.2	9.7	8.3
Q4	13.0	13.7	0.0	9.4	9.5		8.9	14.1	0.4	10.1	9.4
Average	10.0	10.2	0.3	9.6	10.4		5.7	8.2	0.1	9.3	9.1

Source: :PE deal data; Datastream; team analysis

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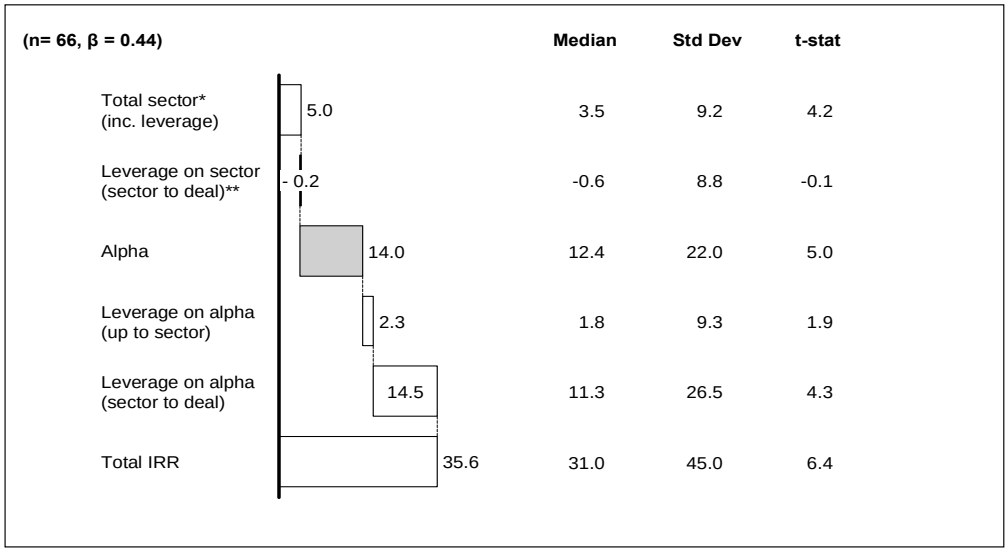
Table 14

IRR disaggregation, adjusted for deal risk

IRR decomposition (%)



* Sector return reflects the market return and the additional return (over the market) by the comparable sectors over the deal period

** Deal leverage effect assumes sector leverage is increased to the deal leverage

Source: PE deal data; Datastream; team analysis

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